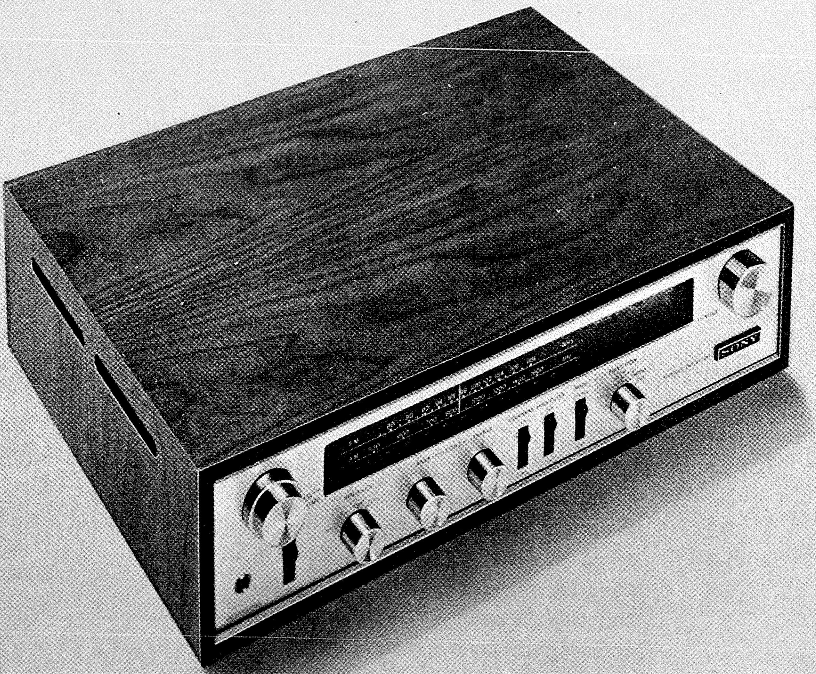
# STR-222

ISO

*Set using ISO screws*



SONY®

# SERVICE MANUAL

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# SECTION 1
# TECHNICAL DESCRIPTION

## 1-1. TECHNICAL SPECIFICATIONS

Technical specifications for the STR-222 are given in Table 1-1.

TABLE 1-1. TECHNICAL SPECIFICATIONS

**Fm Tuner Section**

| | |
|---|---|
| Antenna: | 300 ohms balanced |
| Tuning range: | 87 to 108 MHz |
| Sensitivity: | 2.0 $\mu$V (S/N 30 dB) |
| S/N ratio: | 65 dB |
| Capture ratio: | 2 dB |
| Selectivity: | 50 dB |
| Image rejection: | 47 dB |
| I-f rejection: | 90 dB |
| Spurious rejection: | 78 dB |
| A-m suppression: | 50 dB |
| Frequency response: | 20 to 15,000 Hz ± 1 dB |
| Harmonic distortion: | Mono: 0.5%, IHF<br>Stereo: 0.8%, IHF |
| 19 kHz, 38 kHz suppression: | 55 dB |

**A-m Tuner Section**

| | |
|---|---|
| Antenna: | Built-in ferrite bar antenna with external antenna terminal |
| Tuning range: | 530 to 1,605 kHz |
| Sensitivity: | 48 dB/m, built-in antenna<br>10 $\mu$V, external antenna |
| I-f rejection: | 40 dB at 1,000 kHz |
| Harmonic distortion: | 0.8% |

**Audio Amplifier Section**

| | |
|---|---|
| Dynamic power: | 28 watts both channels operating (1% distortion) |
| Rated output: | 8 watts per channel, both channels operating |
| Power bandwidth: | 30 Hz to 15 kHz, IHF |
| Harmonic distortion: | Less than 0.8% at 1 kHz at rated output |
| Frequency response: | PHONO : RIAA curve<br>TAPE : 20 Hz to 50 kHz<br>REC/PB : 20 Hz to 50 kHz |
| Input sensitivity and impedance: | PHONO<br>(MAGNETIC) : 3.4 mV 47 k<br>(CERAMIC) : 250mV 2.7M<br>AUX : 250mV 100k<br>TAPE : 480mV 100k<br>REC/PB : 480mV 100k |
| Signal output and output impedance: | REC OUT : 480mV 10 k<br>REC/PB : 36mV 80 k |
| Signal-to-noise ratio: | PHONO<br>(MAGNETIC): greater than 55 dB<br>(CERAMIC) : greater than 40 dB<br>TAPE : greater than 65 dB<br>REC/PB : greater than 65 dB |
| Tone controls: | BASS : $^{+14}_{-8}$ dB at 100 Hz<br>TREBLE: ±8 dB at 10 kHz |

**General**

| | |
|---|---|
| Power consumption: | Approx. 60 watts |
| Power requirement: | 100, 117, 220, 240 volts ac |
| Dimensions: | 420 mm(width) x 117 mm (height)x313 mm(depth)<br>$16\frac{9}{16}$"(width)x$4\frac{5}{8}$"(height) x $12\frac{5}{16}$"(depth) |
| Net weight: | 5.6 kg (12 lb 5.5 oz) |
| Shipping weight: | 7.0 kg (15 lb 3.2 oz) |

## 1-2. CIRCUIT FEATURES

### *Fm Tuner Section*

A field-effect transistor in the front-end improves sensitivity, noise figure and overload capacity.

A newly-developed local oscillator provides drift-free operation, but automatic frequency control is provided for easy tuning.

Four i-f stages, using four ceramic filters, ensure high selectivity, sharp skirt response, and essentially flat response within the selected channel's frequency range. This results in excellent adjacent-channel separation on fm broadcast.

### *A-m Tuner Section*

Two ceramic filters in the a-m tuner provide good selectivity and adjacent-channel rejection.

## 1-3. DETAILED CIRCUIT ANALYSIS

The following describes the function or operation of all stages and controls. The text sequence follows signal paths. Stages are listed by transistor reference designation at the left margin; major components are also listed in a similar manner. Refer to the block diagram on page 7 and the schematic diagrams on pages 33 to 36.

| *Stage/Control* | *Function* |
|---|---|
| **Fm Front End** | |
| Balun B101 | This transformer matches 300-ohm twin lead to the fm front-end's input stage to efficiently couple the received signal to the front-end. |
| Rf amplifier<br>Q101 | The rf amplifier and tuned circuits provide high sensitivity, good image rejection and selectivity.<br>Field-effect transistor Q101 is ideally suited for this job since it has low-noise characteristics and a wide dynamic range. The latter characteristic results in very-low cross-modulation products. The secondary winding of L101 is tapped to match the low input impedance of the grounded-gate amplifier. |
| Local oscillator<br>Q103 | This oscillator supplies injection voltage to the mixer through L103. The circuit is a modified Hartley oscillator with the feedback applied to the emitter from a tap on tank coil L103. |
| AFC circuit<br>D101, D102<br>C118, C119<br>R113, R114, R115 | An automatic frequency control circuit is incorporated in the oscillator to provide easy reception of fm signals. Tuning is usually performed by ear, that is, turning the tuning knob and setting it to the position where the clearest sound is heard. However, this is a rather difficult job. By using afc, the difficulty of tuning and frequency drift in the local oscillator can be eliminated.<br>Afc operation is as follows: (Refer to the Fig. 1-1 during the following discussion)<br>When the tuner is correctly tuned the afc circuit does not operate because the intermediate frequency is exactly 10.7 MHz. No dc component is produced at the ratio detector (as shown by the "S" curve response in Fig. 1-1) and fed back to variable-capacitance diode D102. Now, assume that the local oscillator frequency changes by $+\Delta f$. This means the intermediate frequency increases to 10.7 MHz $+\Delta f$. See Fig. 1-1. As the result a positive dc component is fed back to the anode of D102, decreasing the reverse voltage to it, and making D102's barrier capacitance increase. This decreases the local oscillator frequency, since the series circuit composed of C116 and D102 is connected in parallel with the tank circuit of the local oscillator.<br>Conversely, if the local oscillator frequency decreases, a negative dc voltage is fed back to D102, increasing the local oscillator frequency. |
| Mixer Q102 | Rf signals and local oscillator voltage are heterodyned in the base-emitter junction of mixer Q102 to produce 10.7 MHz i-f output signal. |
| IFT101 | Transformer IFT101 and capacitor C105 and C106 form a 10.7 MHz tuned circuit. This tuned circuit is a high "C" circuit, thus it reduces the higher-order harmonics of 10.7 MHz which cause cross modulation or spurious interference. |
| **I-f Amplifier** | |
| I-f amplifiers<br>Q201 to Q204 | The i-f amplifier stages consist of two pairs of direct-coupled amplifiers that provide essentially flat response. The selectivity of this section is determined by two pairs of filters (CF201 and |

| *Stage/Control* | *Function* |
|---|---|
|  | CF202, CF203 and CF204) in the interstage-coupling path.<br>Each of these filters is a two-section ceramic filter that operates in the "trapped-energy" mode.<br>The filters provide extremely-sharp skirt selectivity and flat response inside the pass band. These filters largely determine overall selectivity in the fm tuner. |
| Ratio detector<br>D201, D202 | IFT201 and diodes D201 and D202 form a balanced ratio detector that transforms the frequency-modulated signal into an audio signal.<br>Output appears across C221. |
| Meter circuit | The i-f signal from the collector of Q203 is fed via C218 to the voltage doubler consisting of D203 and D204. The dc output of this circuit is a positive voltage proportional to carrier level, and is fed to the meter. D403 is shunted across the TUNER INPUT METER M1 to protect it from overload. |

| *Stage/Control* | *Function* |
|---|---|
| **MPX Decoder** |  |
| SCA trap<br>L302, C326 | The composite signal containing monaural information from 0 to 15 kHz, the 19 kHz pilot carrier, and the fm stereo signal at 38 kHz, is fed to Q301 through trap L302-C326. This trap removes the unwanted SCA signals to feed a clean composite signal to the base of Q301 (the 19 kHz amplifier). |
| 19 kHz amplifier<br>Q301 | This stage serves two functions. It extracts the 19 kHz pilot signal by means of a tuned circuit at its collector, and provides a low-impedance source of composite stereo signal (without the pilot carrier) at its emitter. A series-resonant circuit in the emitter circuit eliminates the 19 kHz pilot signal in the composite stereo signal. |
| Frequency doubler<br>D301, D302 | Signals developed at the collector of Q301 are transformer coupled to a fullwave rectifier consisting of D301 and D302. The output of this rectifier is not filtered, resulting in two |

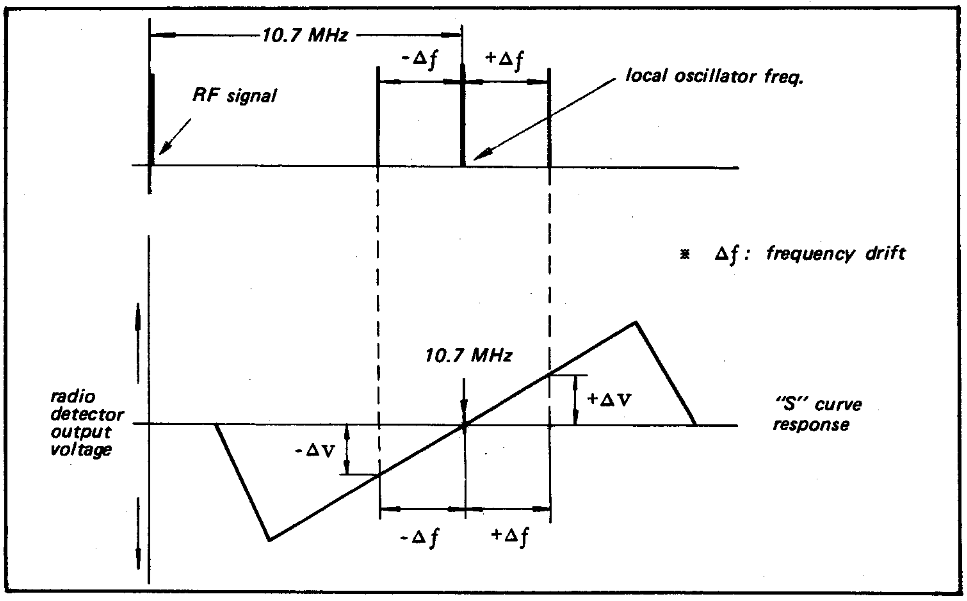


*Fig. 1-1 Local oscillator frequency drift and afc voltage relation.*

| *Stage/Control* | *Function* |
|---|---|
| | positive pulses for each input cycle. Thus, the 19 kHz pilot-carrier frequency is effectively doubled by D301 and D302. However, the waveform is not sinusoidal at the base of Q303. |
| 38 kHz amplifier<br>Q303 | The 38 kHz pulses produced by D301 and D302 are amplified by Q303. The tank circuit at the collector of Q303 is tuned to 38 kHz to restore these pulses to a sinusoidal waveform. This signal is transformer coupled to the bridge-type demodulator to supply sampling drive for the demodulator. |
| STEREO lamp circuit<br>Q302 | The STEREO indicator lights when the FUNCTION switch is set to the FM AUTO STEREO position and an fm stereo signal is received. The emitter of Q303 is connected to the base of Q302 which is normally cut off.<br>The circuit operates as follows:<br>When a composite stereo signal is applied to the multiplex decoder, the 38 kHz pulses produced at the output of the frequency doubler yield a higher average current flow through Q303. This forces Q302 into conduction, lighting STEREO indicator lamp PL1. |
| Multiplex demodulator<br>D303, D304<br>D305, D306 | The demodulator circuit employs four diodes in a balanced-bridge arrangement. This system has the advantage of cancelling residual rf components (38 kHz signal, some 19 kHz signal, and higher-order harmonics of these frequencies).<br>"L" and "R" components are developed at each side of the bridge as the result of demodulation, when the receiver is operated in the stereo mode. In the monaural mode, diodes D303 and D304 are forward biased by supply voltage through R314, the stereo indicator lamp, R313, R316 and R317, so these diodes merely act as small resistances. Under this condition, the monaural signal is applied to both "L" and "R" audio amplifiers. |
| De-emphasis circuit<br>C314, C315<br>C322, C323 | These capacitors provide the roll-off at high audio frequencies necessary to compensate for pre-emphasis at the transmitter. Roll-off frequency is about 3.1 kHz for USA, 2.1 kHz for general export model. |
| Twin-T filter<br>C316, C319, C320<br>R322, R325, R326<br>(C317, C318, C321<br>R323, R324, R327) | This filter eliminates the 38 kHz carrier, thereby preventing carrier leak. |
| **A-m Tuner** | |
| Local oscillator<br>Q404 | This stage supplies injection voltage to the mixer via a winding on L402. The circuit is a modified Hartley oscillator with feedback applied to the emitter of Q405 from the tap on the secondary winding of oscillator coil L402. |
| Mixer Q401 | Incoming rf signals and local-oscillator voltage are heterodyned in the base-emitter junction of Q401 to produce the 455 kHz output.<br>IFT401 is a transformer tuned for 455 kHz. It develops the i-f signal, and provides a path to ground through bypass capacitor C404 for the other heterodyne products. The low-impedance output winding of IFT401 provides link coupling to i-f amplifier Q402. |
| I-f amplifier<br>Q402<br>Solid-state filter<br>CF401 | This stage is basically an RC-coupled amplifier. The selectivity of the stage is determined by a double ceramic filter (CF401) in the interstage-coupling path. This filter provides extremely sharp skirt selectivity inside the pass band. |
| I-f amplifier<br>Q403 | This circuit provides the power to drive diode detector D401. |

| *Stage/Control* | *Function* |
|---|---|
| Agc circuit<br>D402, R415<br>C423, C424<br>R431<br>R429, C426 | The positive dc component at the cathode of diode D402 is fed back to the base of Q403 to control its gain. The emitter voltage of Q403 is fed back to the base of Q401 for additional gain control. The time constants of the agc components filter audio variations out of the agc voltage. |

### Audio Amplifier

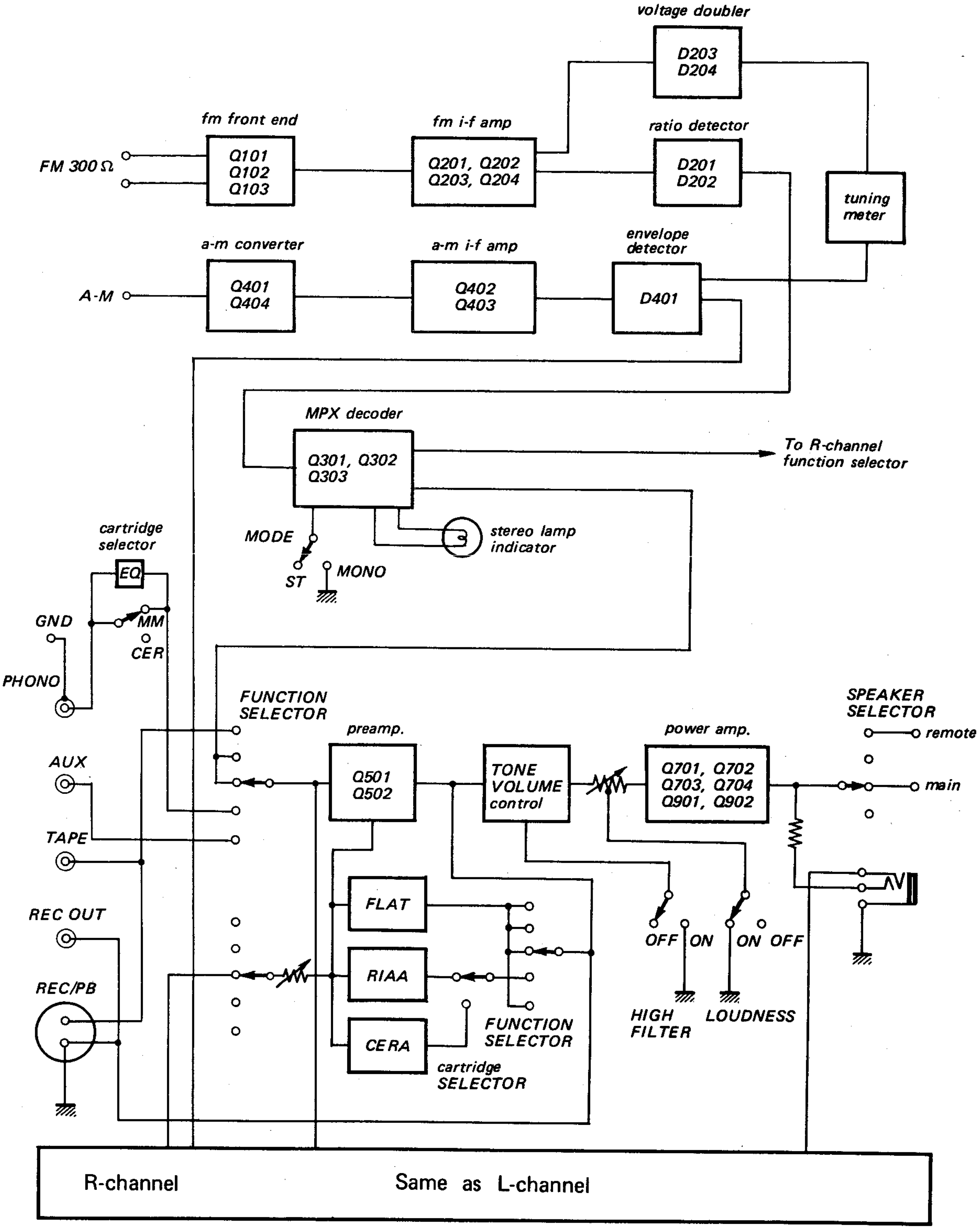
Since the audio-amplifier section contains two identical amplifier chains, only the left channel will be described.

| *Stage/Control* | *Function* |
|---|---|
| Cartridge Selector<br>S2 | Changes PHONO input sensitivity and equalization response according to the phono-cartridge which is to be connected.<br>In the MAGNETIC position, input signal is fed directly to the equalizer amplifier which is arranged to produce RIAA equalization.<br>In the CERAMIC position, input signal is attenuated about 33 dB by R851 (2.7 M) and R501 (47 k).<br>This allows the STR-222 to accept a ceramic cartridge's output and amplify it without distortion. Furthermore, equalization is switched out to provide flat response for the ceramic cartridge. |
| REC/PB Connector<br>(General Export Model only) | Accepts or supplies the connection between tape recorder and STR-222 when recording or playbacking. |
| MODE switch<br>S3 | In the STEREO position of S3, left and right input signals are routed to their respective amplifiers. In the MONO position, the left and right signals are added. The sum is then fed to both amplifier channels. |
| Preamplifier<br>Q501, Q502 | This stage amplifies the small signal provided by the phono cartridge, tape recorder, or signals applied to the AUX input jack, to the level required at the input of the power-amplifier section. This direct-coupled amplifier uses a complicated negative-feedback technique that provides stable operation during temperature changes, and good amplification at low frequencies. It also applies the audio signal to the REC OUT jack for optimum recording. In addition, RIAA equalization is accomplished in this section when the FUNCTION switch is set to the PHONO position and phono-cartridge selector switch is in the MAGNETIC position. |
| Equalization circuit<br>C507, C508<br>R510 | RIAA equalization is achieved by the negative-feedback loop containing these components. Be sure to use replacement components with the exact same values. |
| Feedback circuit<br>R509, C506 | In the FM, AM, AUX or TAPE position of the FUNCTION switch, feedback is applied through R509 and C506 to provide a flat response in the preamplifier in the audible frequency range. |
| Attenuator<br>R902, R904 | Signal applied to the AUX input jack is attenuated by these resistors. |
| Attenuator<br>R901, R903 | Signal applied to the TAPE input jack is attenuated by these resistors. This allows the STR-222 to accept signals of about 250 mV at the AUX input jack, and 480 mV at the TAPE input jack, and amplify them without distortion. |
| Channel separation adj.<br>RV551 | This network connects the emitters of preamplifiers Q501 and Q551 only when the FUNCTION switch is set to the FM position. It provides a form of negative feedback between the left and right channels. Any residual inverted "L" signals in the "R" channel are cancelled out by the "L" signal from the "L" |

| *Stage/Control* | *Function* |
|---|---|
|  | channel. The same is true of residual "R" signals in the "L" channel.<br>RV551 is therefore set for maximum channel separation. |
| BASS control<br>RV601 | This control has a range of $^{+14}_{-8}$ dB at 100 Hz. |
| TREBLE control<br>RV602 | This control has a range of ±8 dB at 10 kHz. |
| Loudness circuit<br>R605, R606<br>C606, C607 | This compensates for the characteristics of the human ear, whose tonal response varies according to the loudness of the sound being heard. When an audio signal is fed to the loudness circuit, high- and low-frequency components are increased in inverse proportion to the VOLUME control setting. |
| VOLUME control<br>RV901 | The level of signal applied to the power amplifier is determined by the setting of RV901. |
| Audio driver<br>Q701 | Q701 amplifies the signal to the level required at the power output stages. |
| Ac balance adj.<br>RV701 | Adjusts the bias current of Q701 and Q702 to the point where positive and negative half cycles are simultaneously clipped as the input signal increases. It also affects the rated output power. |
| Phase inverter<br>Q702 | Stage Q702 has two oppositely-phased outputs to drive the power-output stages in push pull.<br>Equal ac loads are used in the collector and emitter circuits to provide equal but oppositely-phased signals at the bases of Q703 and Q704. |
| Dc bias adj.<br>RV702 | Controls the bias current in Q703, Q704, Q705 and Q706 to eliminate crossover distortion at small signal levels. |

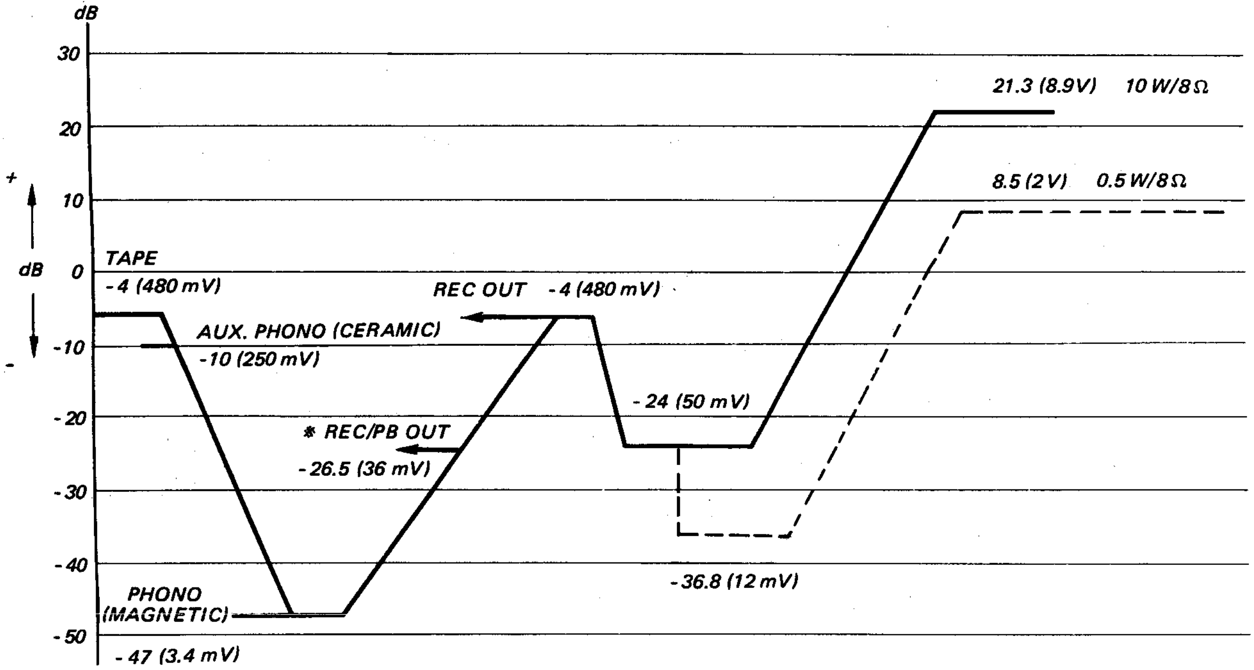
| *Stage/Control* | *Function* |
|---|---|
| Negative-feedback loop<br>R714, R718<br>C707 | These components provide negative-feedback voltage from the output of the power amplifier to the emitter of Q701. |
| Drivers<br>Q703, Q704 | These transistors operate as emitter followers to provide the current swings demanded by the output stages for full output. |
| Power amplifiers<br>Q901, Q902 | These SONY silicon transistors have been specially manufactured to drive the speaker system. Output is coupled to the speakers through C709. |
| **Power Supply** |  |
| Voltage regulator<br>Q801, Q802 | Dc output from rectifier D801 is filtered by C903 and applied to series regulator Q802. Q801 compares a sample of the output voltage picked off across R804 with reference voltage supplied by voltage stabilizer D701, D702 and D703. A change in output voltage is detected at the base of Q801 and therefore alters its collector voltage. Since the collector of Q801 is directly coupled to the base of Q802, the change in output voltage alters the conduction of Q802 by the amount necessary to maintain the output voltage constant. An increase in output voltage causes an increase in the impedance (decrease in conduction) of Q802, and vice-versa. The dc output voltage thus supplied to the tuner section is stable. |
| Rectifier<br>D801 | Diode D801 (consisting of two diodes) forms a full-wave rectifier to supply operating voltage to all of the stages. |
| Voltage stabilizer<br>D701, D702<br>D703 | These diodes are forward biased by supply voltage through R725 and provide a stabilized voltage of about 1.8 V to bias transistors Q703 and Q704. |

## BLOCK DIAGRAM

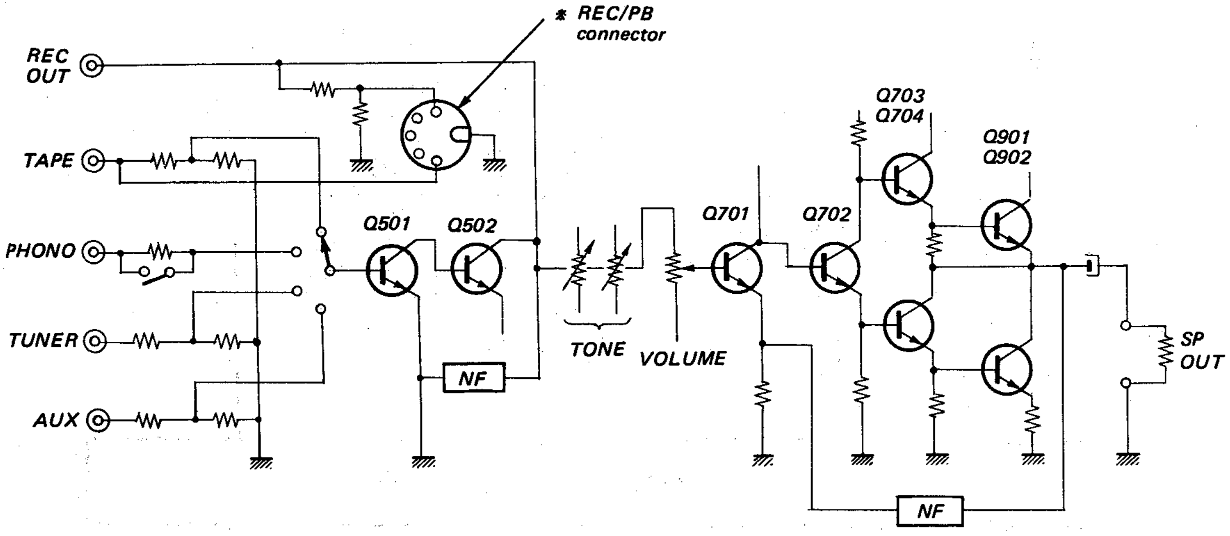

voltage doubler
D203
D204
fm front end
fm i-f amp
ratio detector
FM 300Ω
Q101
Q102
Q103
Q201, Q202
Q203, Q204
D201
D202
tuning meter
a-m converter
a-m i-f amp
envelope detector
A-M
Q401
Q404
Q402
Q403
D401
MPX decoder
Q301, Q302
Q303
To R-channel function selector
cartridge selector
EQ
MODE
ST
MONO
stereo lamp indicator
GND
MM
CER
PHONO
FUNCTION SELECTOR
preamp.
power amp.
SPEAKER SELECTOR
remote
main
AUX
Q501
Q502
TONE
VOLUME
control
Q701, Q702
Q703, Q704
Q901, Q902
TAPE
REC OUT
FLAT
RIAA
CERA
OFF
ON
ON
OFF
HIGH FILTER
LOUDNESS
REC/PB
FUNCTION SELECTOR
cartridge SELECTOR
R-channel
Same as L-channel

## LEVEL DIAGRAM

**Note:** Signal voltages are measured with VTVM and expressed in dB refered to 0.775V, 1 kHz.



* General Export Model only


* REC/PB
connector
REC
OUT
TAPE
PHONO
TUNER
AUX
Q501
Q502
NF
TONE
VOLUME
Q701
Q702
Q703
Q704
Q901
Q902
NF
SP
OUT

# SECTION 2
# DISASSEMBLY AND REPLACEMENT PROCEDURES

### WARNING

Unplug the ac power cord before starting any disassembly or replacement procedures.

## 2-1. TOOLS REQUIRED

The following tools are required to perform disassembly and replacement procedures on the STR-222.

Screwdriver, Phillips-head
Screwdriver, 1/8" blade (3 mm)
Wrench, adjustable
Pliers, long-nose
Diagonal cutters
Nutdriver, 3 mm (1/8")
Tweezers
Cardboard, 77 mm (3") square
Protective cloth
Soldering iron, 40–150 watts
Cement solvent
Silicone grease
Tape, electrical
Cement, contact

## 2-2. HARDWARE IDENTIFICATION GUIDE

The following chart will help you to decipher the hardware codes given in this service manual.

**Note:** All screws in the STR-222 are manufactured to the specifications of International Organization for Standardization (ISO). This means that the new and old screws are not interchangeable because ISO screws have a different number of threads per mm compared to the old ones. The ISO screws have an identification mark on their heads as shown in Fig. 2-1.

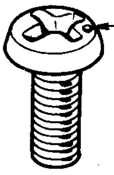


*Fig. 2-1 ISO screw*

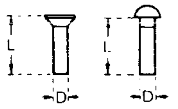
**Hardware Nomenclature**

| | | |
|---|---|---|
| **P** | Pan Head Screw | ⊕ |
| **PS** | Pan Head Screw with Spring Washer | ⊕ |
| **K** | Flat Countersunk Head Screw | ⊕ |
| **B** | Binding Head Screw | ⊕ |
| **RK** | Oval Countersunk Head Screw | ⊕ |
| **T** | Truss Head Screw | ⊕ |
| **R** | Round Head Screw | ⊕ |
| **F** | Flat Fillister Head Screw | ⊖ |
| **SC** | Set Screw | ⊖ |
| **E** | Retaining Ring (E Washer) | |

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

**– Example –**

⊕ P 3x10
Type of Slit
Length in mm (L)
Diameter in mm (D)
Type of Head



## 2-3. WOODEN-CASE AND FRONT-PANEL REMOVAL

1. Remove all control knobs by pulling them off.
2. Remove the two (+P 3x6) screws; one is just above the VOLUME control shaft and the other is also above the TUNING shaft. See Fig. 2-3.
3. Remove the three hex nuts that secure the front panel to the SPEAKER switch, TREBLE control, and FUNCTION switch. See Fig. 2-3. Place a piece of cardboard or cloth between the wrench and front panel to avoid marring the panel. As shown in Fig. 2-2.
4. Remove the two screws (+P 3x6) securing the hardboard to the rear panel, as shown in Fig. 2-4.
5. Remove the five (+P 4x16) screws and four (+P 3x14) screws securing the wooden case to the chassis from the bottom as shown in Fig. 2-5.

6. Carefully draw back the receiver unit about 1¼″ then take out the front panel. See Fig. 2-6.

**Note:** Do not try to draw the receiver unit out of the wooden case without removing the front panel first.

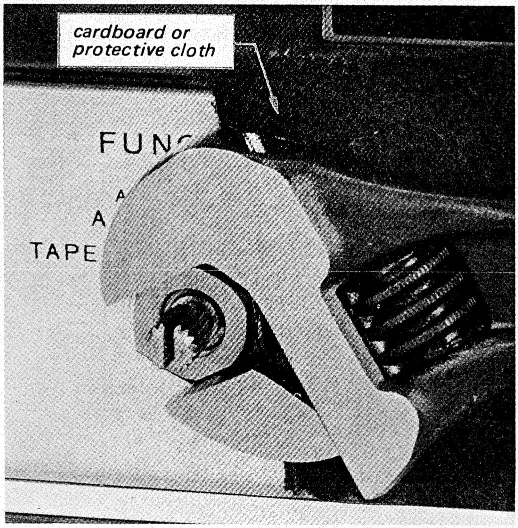

cardboard or protective cloth
FUNC
A
A
TAPE

*Fig. 2-2 Hex nut removal*

7. Pull the receiver unit out of the wooden case from the rear as shown in Fig. 2-7.

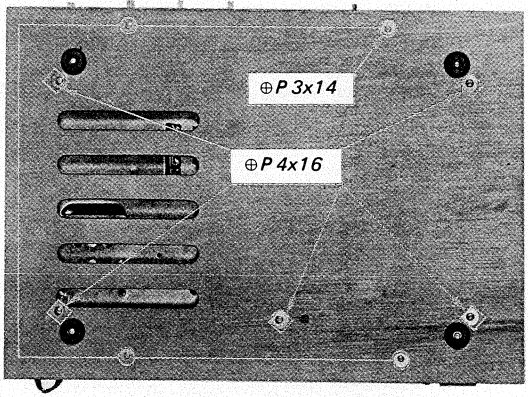

⊕P 3x14
⊕P 4x16

*Fig. 2-5 Bottom view*

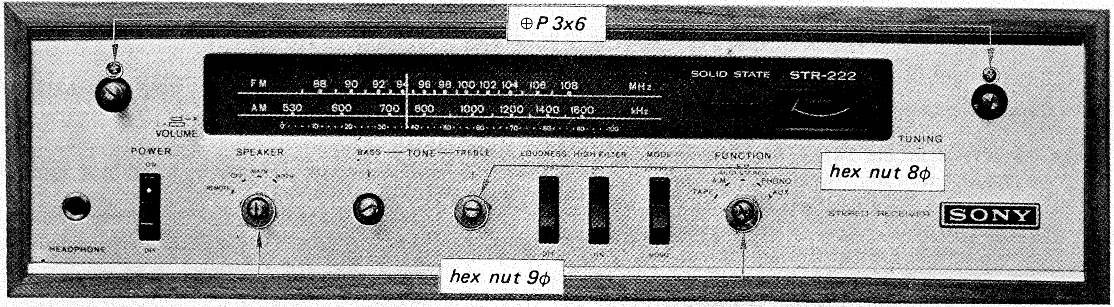

⊕P 3x6
FM 88 90 92 94 96 98 100 102 104 106 108 MHz
AM 530 600 700 800 1000 1200 1400 1600 kHz
SOLID STATE STR-222
VOLUME
POWER
SPEAKER
BASS — TONE — TREBLE
LOUDNESS
HIGH FILTER
MODE
FUNCTION
TUNING
hex nut 8φ
hex nut 9φ
HEADPHONE
STEREO RECEIVER
SONY

*Fig. 2-3 Front-panel removal*

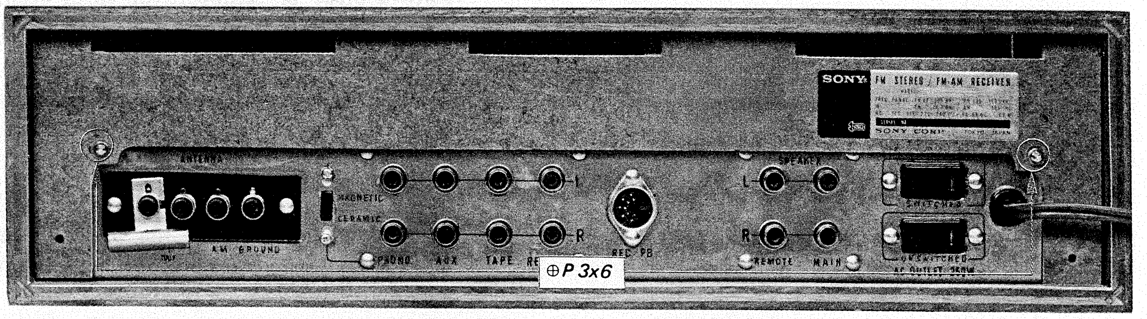

SONY FM STEREO / FM-AM RECEIVER
ANTENNA
AM GROUND
MAGNETIC
CERAMIC
PHONO
AUX
TAPE
REC PB
SPEAKER
REMOTE
MAIN
⊕P 3x6

*Fig. 2-4 Rear-panel removal*

## 2-4. PILOT LAMP REPLACEMENT

*Preparation*

Remove the wooden case as described in Procedure 2-3.

*Dial Lamp*

1. Pry out the defective lamp from the socket with tweezers or long-nose pliers.
2. Install a new lamp.

*Meter Lamp*

1. Straighten the tab of the meter lamp holder to permit the removal of the meter-lamp socket; then pull out the meter-lamp socket. See Fig. 2-8.
2. Unscrew the lamp from the socket and install a new one.

*STEREO Lamp*

1. Remove the two screws (+P 3×6) securing the lamp shade to the front sub-chassis. See Fig. 2-8.
2. Pry out the lamp from its holder with tweezers.
3. Cut the leads of the lamp in the middle and solder the lead wires to a new lamp.

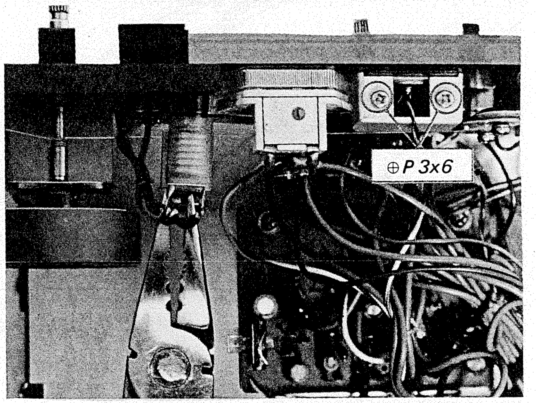


*Fig. 2-8 Meter-lamp socket removal and stereo lamp replacement*

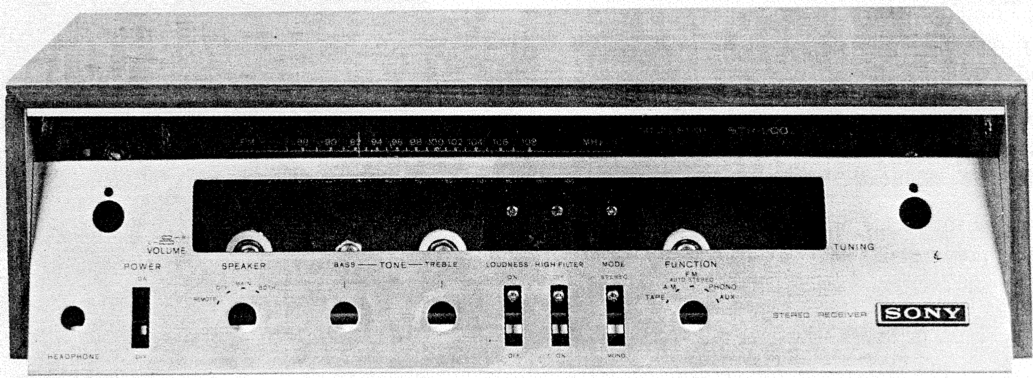

VOLUME
POWER
ON
OFF
HEADPHONE
SPEAKER
REMOTE
MAIN
BOTH
BASS — TONE — TREBLE
LOUDNESS
HIGH FILTER
MODE
STEREO
MONO
FUNCTION
FM AUTO STEREO
AM
TAPE
PHONO
AUX
TUNING
STEREO RECEIVER
SONY

*Fig. 2-6 Front-panel removal*

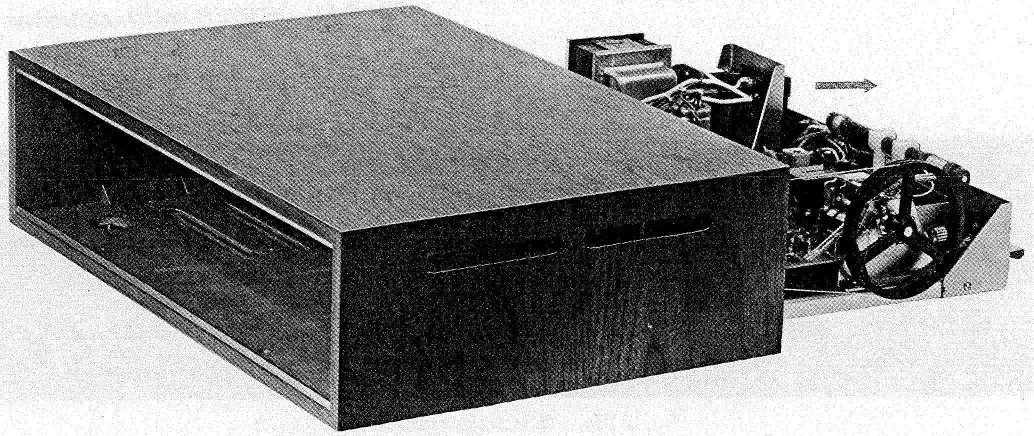


*Fig. 2-7 Wooden-case removal*

4. Wrap the connection point with insulating tape as shown in Fig. 2-9.
5. Install the new lamp in the lamp holder, and fasten the lamp leads to the harness of the lead wires with a string.

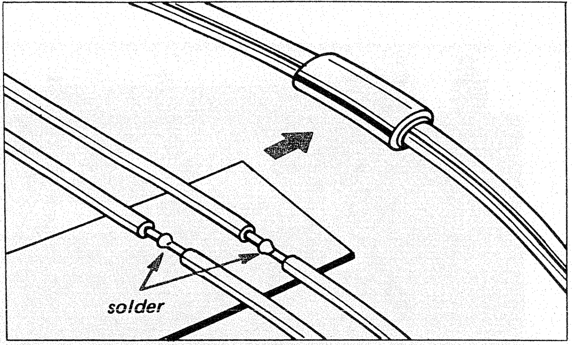


*Fig. 2-9 Connection point of stereo lamp lead*

## 2-5. DIAL SCALE REPLACEMENT

1. Remove the wooden case as described in Procedure 2-3.
2. Pry out the dial lamps from each side of the dial scale.
3. Remove the screws (+P 2.6x6) securing the dial-lamp shade to the front sub-chassis from each side of the dial scale. See Fig. 2-10.
4. Remove the dial-lamp shade from its mounting place; then install a new dial scale.

## 2-6. SWITCH, CONTROL, AND HEADPHONE JACK REPLACEMENT

*Preparation*

Remove the wooden case as described in Procedure 2-3.

*POWER Switch*

1. Remove the two screws (+P 3x6) securing the switch to the front sub-chassis.
2. Pull out the switch and unsolder the leads and encapsulated components from the switch lugs, then solder them to a new switch. See Fig. 2-11.
3. Install the new switch.

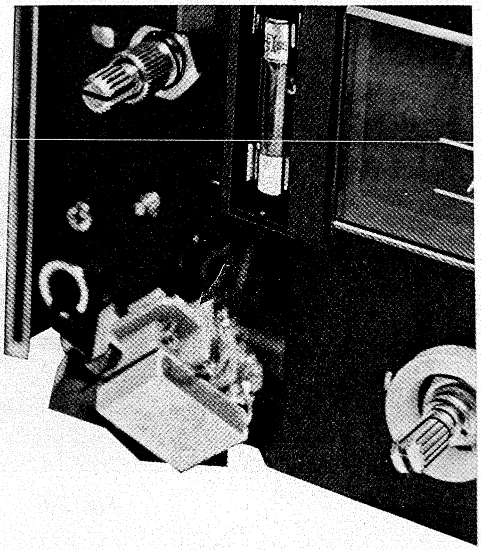


*Fig. 2-11 POWER switch replacement*

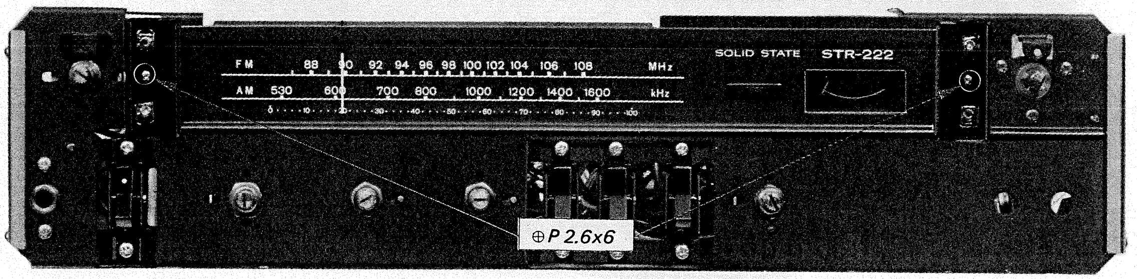


*Fig. 2-10 Dial scale replacement*

### *LOUDNESS Switch*

1. Remove the two screws (+P 3x6) securing the switch to the front sub-chassis.
2. Cut the strings which tie the lead wires together near the LOUDNESS switch with diagonal cutters.
3. Pull out the switch and unsolder the lead wires from the switch's lugs. See Fig. 2-12.
4. Solder the lead wires to a new switch, then install the replacement switch.

### *HIGH FILTER Switch*

1. Remove the four screws (+P 3x6) securing both HIGH FILTER and MODE switches to the front sub-chassis.
2. Pull these switches out together and unsolder the lead wires from the HIGH FILTER switch's lugs, as shown in Fig. 2-13.
3. Solder the lead wires to a new switch, then install the replacement switch.

### *MODE Switch*

1. Remove the four screws (+P 3x6) securing both MODE and HIGH FILTER switches to the front sub-chassis.
2. Cut the yellow-white lead wire connected between the MODE and FUNCTION switches with diagonal cutters at the FUNCTION switch as shown in Fig. 2-14.
3. Pull out these switches and unsolder the lead wires from the MODE switch's lugs, as shown in Fig. 2-15.
4. Solder the lead wires to a new switch, then install the replacement switch.

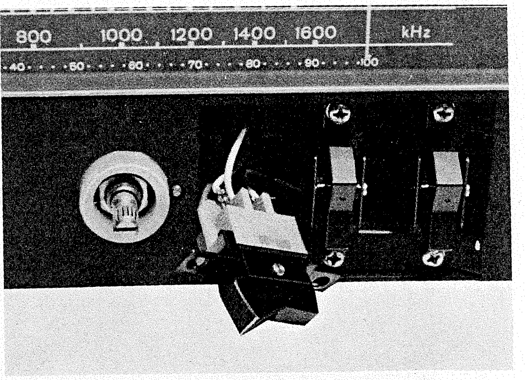


*Fig. 2-12 LOUDNESS switch replacement*

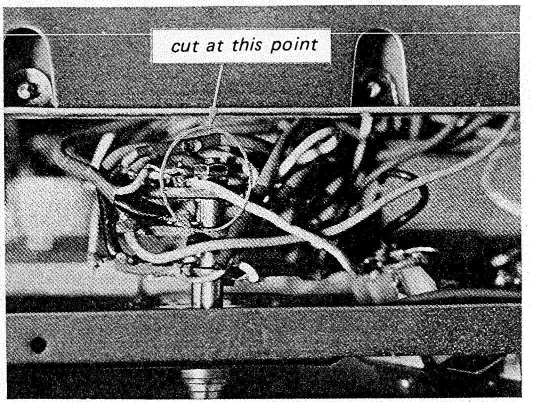


*Fig. 2-14 Lead wire cutting point for MODE switch replacement*

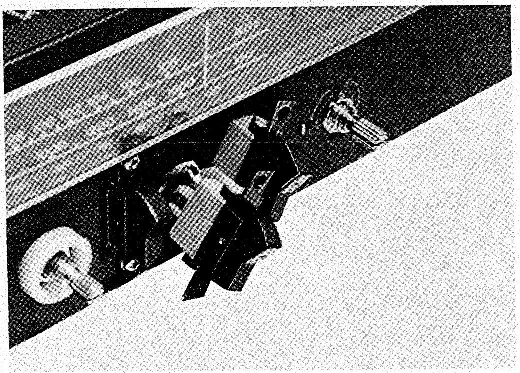


*Fig. 2-13 HIGH FILTER switch replacement*

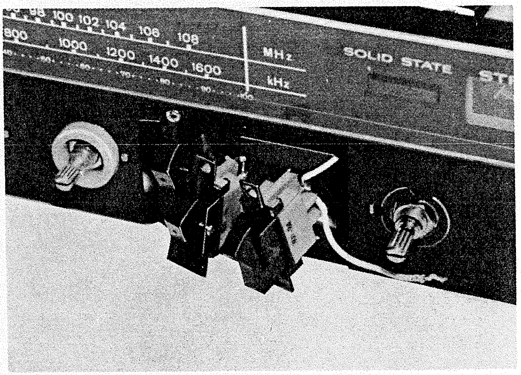


*Fig. 2-15 MODE switch replacement*

*SPEAKER Switch*

1. Apply a drop of cement solvent to the ring spacer on the SPEAKER switch. Wait a few seconds for the cement to dissolve, and pry out the spacer with a screwdriver.
2. Remove the two screws (+P 3x6) securing the heat sink to the chassis. See Fig. 2-16.
3. Remove the hex nut securing the switch to the front sub-chassis.
4. Draw back the heat sink to permit removal of the SPEAKER switch as shown in Fig. 2-17.
5. Unsolder the lead wires and resistors from the switch's lugs.
6. Solder the lead wires and resistors to a new switch; then install the replacement switch.

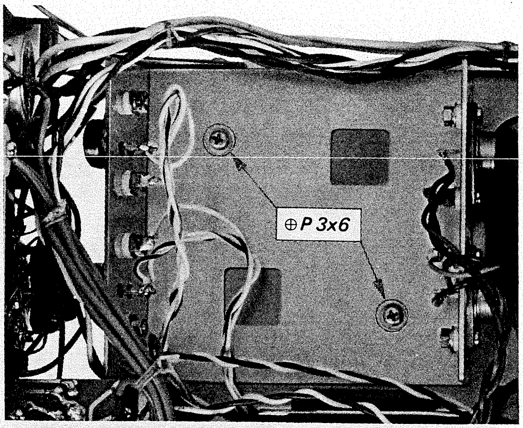


*Fig. 2-16 Heat sink removal*

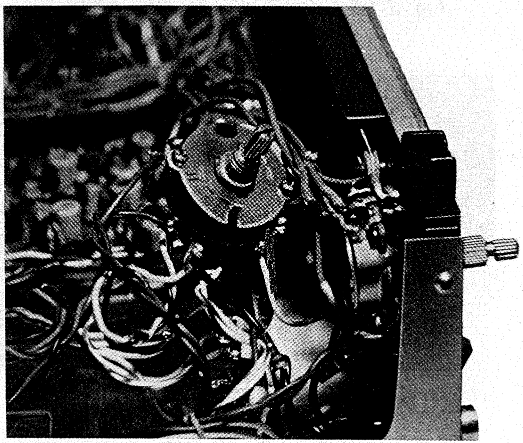


*Fig. 2-17 SPEAKER switch replacement*

*TONE Controls*

1. Apply a drop of cement solvent to the ring spacer on the TREBLE control. Wait a few seconds for the cement to dissolve, and pry out the spacer with a screwdriver.
2. Remove the hex nuts that secure the BASS and TREBLE controls to the front sub-chassis.
3. Remove the VOLUME control by loosening the hex nut.
4. Cut the strings which tie the lead wires together near the TONE-control circuit board with a diagonal cutter.
5. Carefully remove them along with the TONE-control circuit board, as shown in Fig. 2-18.
6. Cut each lug of the defective control on the board to remove the part.
7. Unsolder and remove the clipped lugs, and clean out the circuit board holes.
8. Install the replacement control.

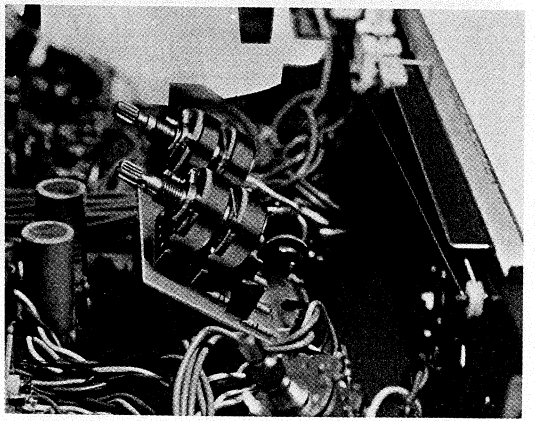


*Fig. 2-18 TONE control replacement*

*FUNCTION Switch*

1. Remove the ring spacer on the FUNCTION switch as described in the SPEAKER switch replacement procedure.
2. Remove the hex nut securing the FUNCTION switch to the front sub-chassis.

3. Cut the two lead wires connecting the MODE and FUNCTION switches. One lead wire is yellow and the other is yellow/white.
4. Remove the two screws (+P 3×6) securing the preamplifier board to the chassis.
5. Carefully remove the switch along with the preamplifier board, as shown in Fig. 2-19.
6. Unsolder the lead wires from the switch lugs.
7. Solder the lead wires to a new switch; then install the replacement switch.

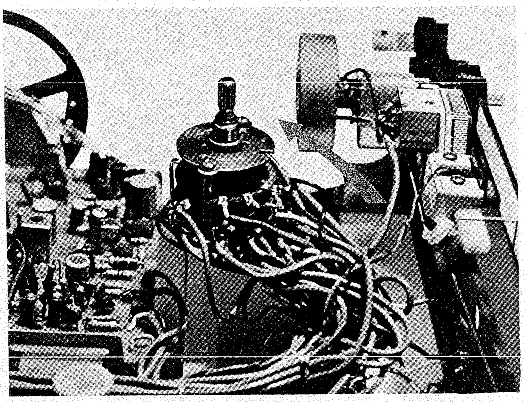


*Fig. 2-19 FUNCTION switch replacement*

*HEADPHONE Jack*

1. Cut the leads of the two resistors connected to the jack lugs, as shown in Fig. 2-20.
2. Remove the two screws and nuts that secure the jack to the front sub-chassis; then pull out the defective jack.
3. Install the replacement jack; then solder the resistors to it.

## 2-7. POWER TRANSISTOR REPLACEMENT

1. Remove the wooden case as described in Procedure 2-3.
2. Remove the two screws (+P 3×6) securing the heat sink to the chassis as shown in Fig. 2-16.
3. Cut the emitter and base leads of the defective power transistor with a diagonal cutter.
4. Remove the two screws (+P 3×12) and nuts securing the power transistor to the heat sink then install a new one.
5. When replacing the power transistor, apply a coating of a heat-transferring silicone grease to both sides of the insulating mica washer. Any excess grease squeezed out when the mounting bolts are tightened should be wiped off with a clean cloth. This prevents it from accumulating conductive dust particles that might eventually cause a short. See Fig. 2-21.

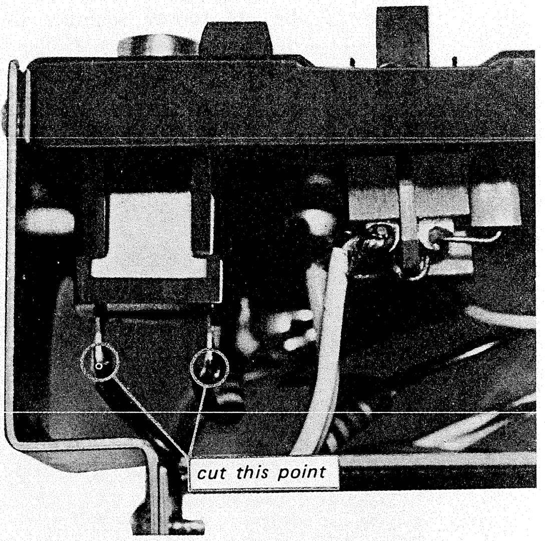


*Fig. 2-20 HEADPHONE jack replacement*

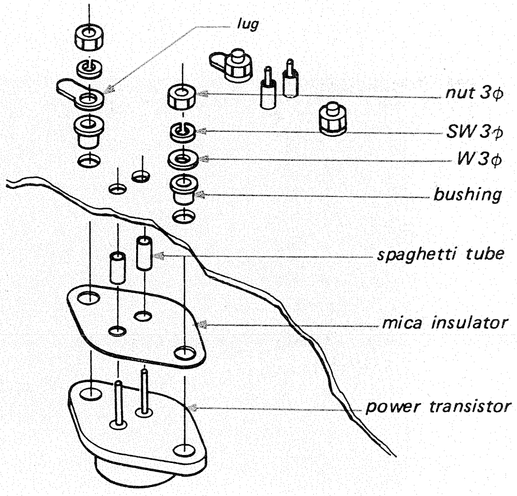


*Fig. 2-21 Power transistor replacement*

## 2-8. TUNER AND MPX BOARD REMOVAL

1. Remove the wooden case as described in Procedure 2-3.
2. Remove the screw (+P 3x6) securing the a-m bar antenna holder and the circuit board to the chassis, as shown in Fig. 2-22.
3. Unsolder the a-m and fm antenna lead wires from the antenna terminal.
4. Turn the tuning knob to set the tuning capacitor at minimum capacitance; then loosen one of the set screws securing the tuning capacitor drive drum to the shaft. See Fig. 2-23.
5. Turn the tuning knob to set the tuning capacitor at mid position and loosen the other set screw of the drive drum.
6. Fasten the dial cord to the drum with cellophane tape as shown in Fig. 2-24.
7. Remove the drive drum from the tuning capacitor shaft and place it close to the chassis. See Fig. 2-25.
8. Remove the two self-tapping screws (+P 3x6) securing the tuning capacitor bracket to the chassis. See Fig. 2-25. Now the circuit board can be turned upside down as shown in Fig. 2-26.

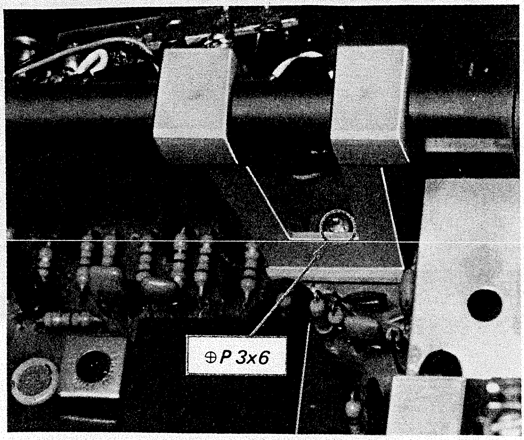


*Fig. 2-22 Bar antenna removal*

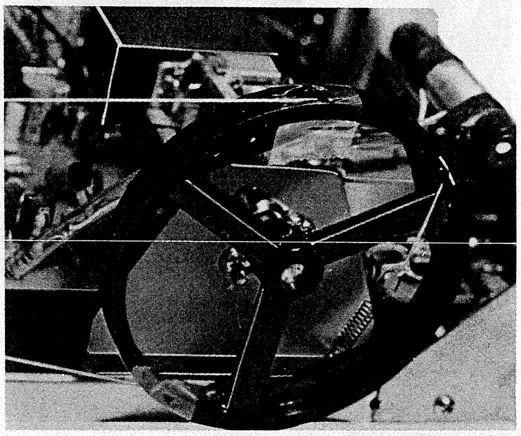


*Fig. 2-23 Tuning capacitor drive drum removal*

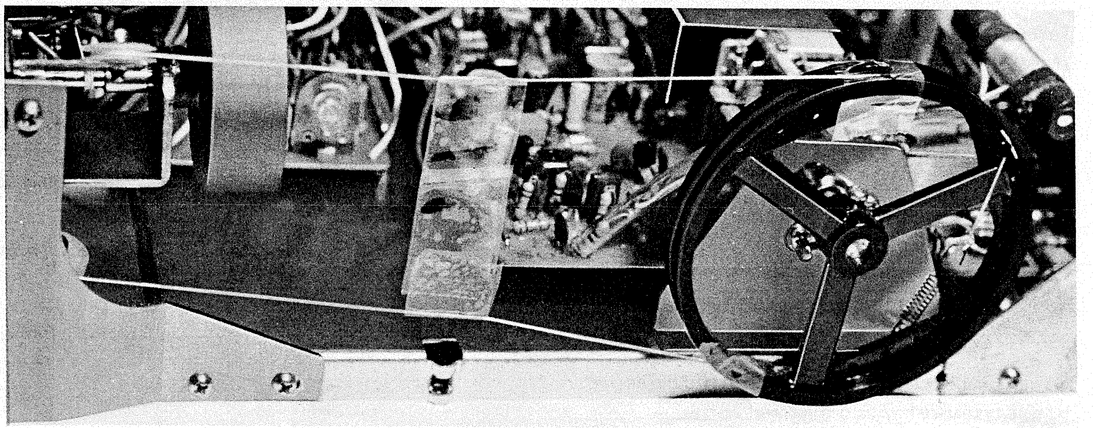


*Fig. 2-24 Dial cord fixing with cellophane tape*

9. After re-installing the drive drum make sure that the best possible dial calibration is obtained. The dial pointer should indicate "O" when the tuning capacitor is set at maximum capacitance, as shown in Fig. 2-27.

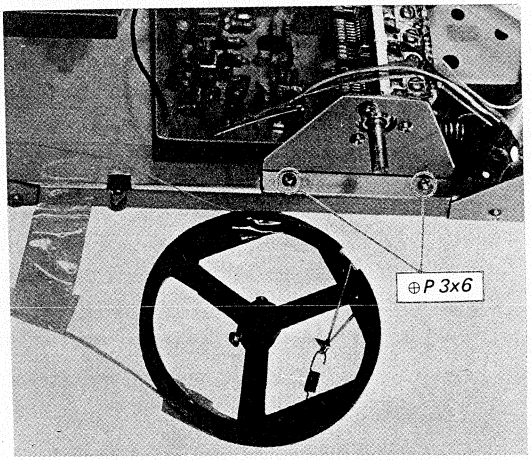


*Fig. 2-25 Tuning capacitor bracket removal*

## 2-9. REPLACEMENT OF COMPONENTS SECURED TO THE REAR PANEL BY RIVETS

1. Remove the rivets securing the defective component as follows:

   (a) Remove the rear panel, then bore out the rivet using a drill bit slightly larger in diameter than the rivet. See Fig. 2-28.

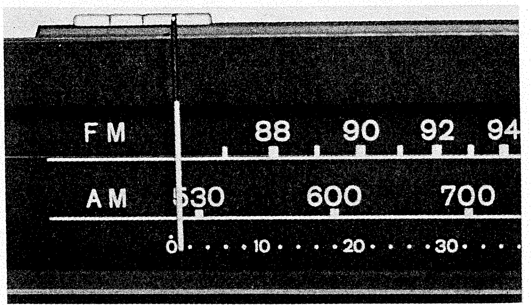


*Fig. 2-27 Dial calibration*

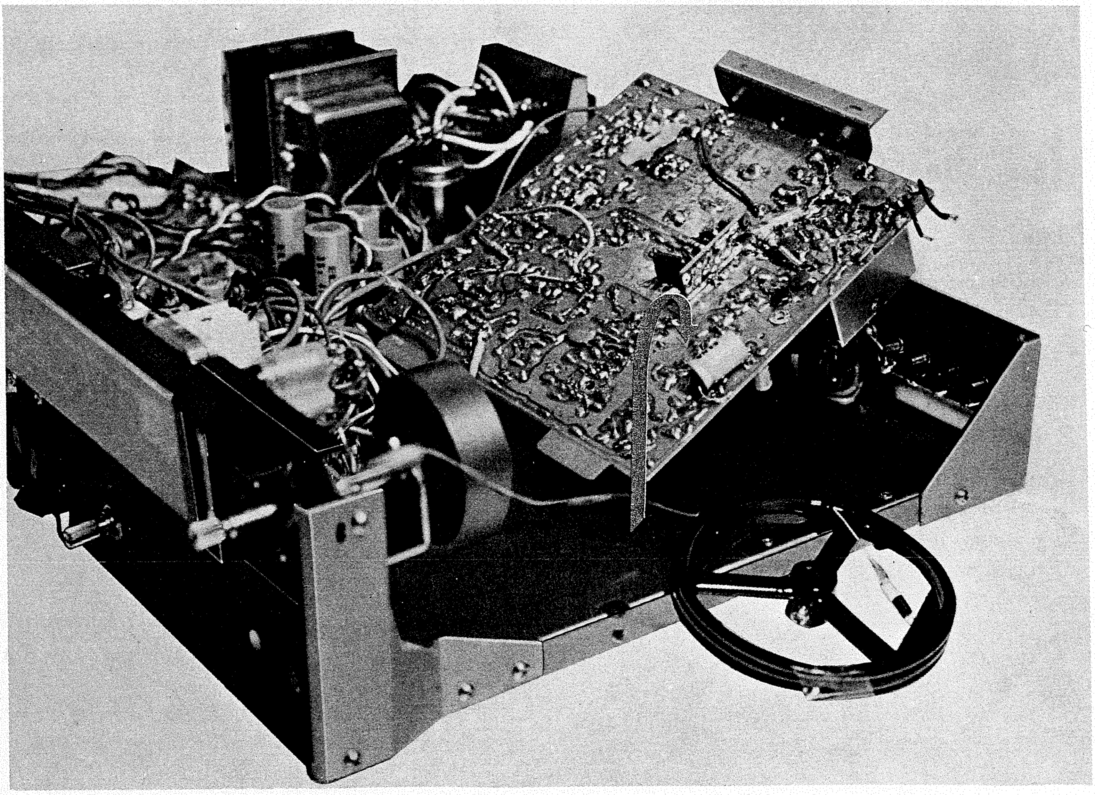


*Fig. 2-26 Tuner and MPX board removal*

(b) When the peened end is bored away, punch out the remainder of the rivet with a nail set or prick punch.

2. Remove the defective component and then install a new one.
3. Secure the new component with a suitable screw and nut or a repair rivet screw (part number 3-701-402).

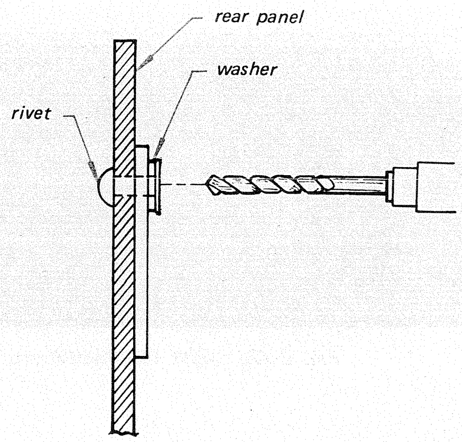


*Fig. 2-28 Rivet replacement*

## 2-10. DIAL CORD STRINGING

*Preparation*

1. Remove the wooden case as described in Procedure 2-3.
2. Cut a 1,570 mm (62 inch) length of dial cord.
3. Tie the end of the cord to a spring as shown in Fig. 2-29.
4. Rotate the tuning-capacitor drive drum fully clockwise (minimum capacitance position); then hook the other end of the spring to the drive drum as shown in Fig. 2-30.

*Procedure*

1. Run the cord through the inner slot in the rim of the drum and wrap half a clockwise turn in the inner side groove as shown in Fig. 2-31.
2. Run the cord over pulley A, B, C, and D then wrap three turns around the tuning shaft as shown in Fig. 2-31.
3. Run the cord over pulley E and wrap one clockwise turn around the outer groove of the drum, then hook it to the coil spring using an eyelet as shown in Fig. 2-32.
4. Pull the cord to give it the proper tension, then squeeze the eyelet. Make a knot in the cord end to keep it from slipping out of the eyelet.
5. After completing the dial-cord stringing, make sure the tuning system works properly.
6. Put the dial pointer on the cord as shown in Fig. 2-33 and move it to a position indicating "O" reading on the dial scale when the tuning capacitor is set to maximum capacitance. See Fig. 2-27 on page 17.
7. Apply a drop of contact cement to the tab of the dial pointer.

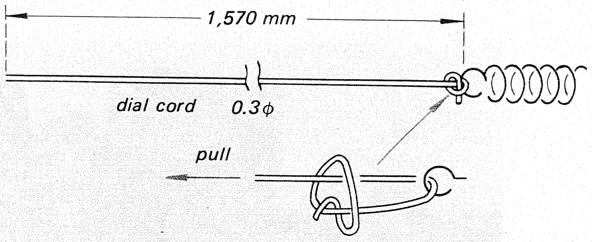


*Fig. 2-29 Dial cord and method of tying square knot*

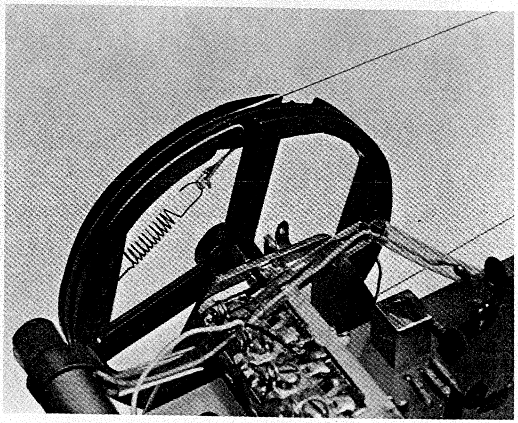


*Fig. 2-30 Dial cord stringing start point*

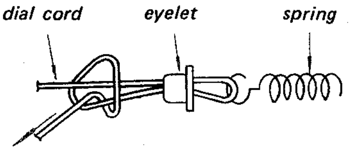

dial cord
eyelet
spring

*Fig. 2-32 Finish of dial-cord stringing*

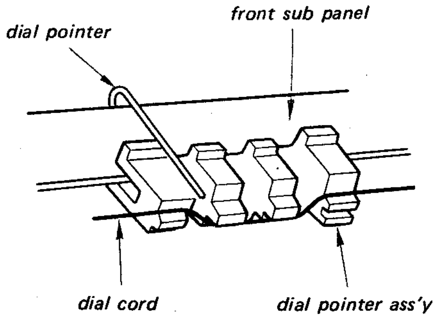

dial pointer
front sub panel
dial cord
dial pointer ass'y

*Fig. 2-33 Dial pointer installation*

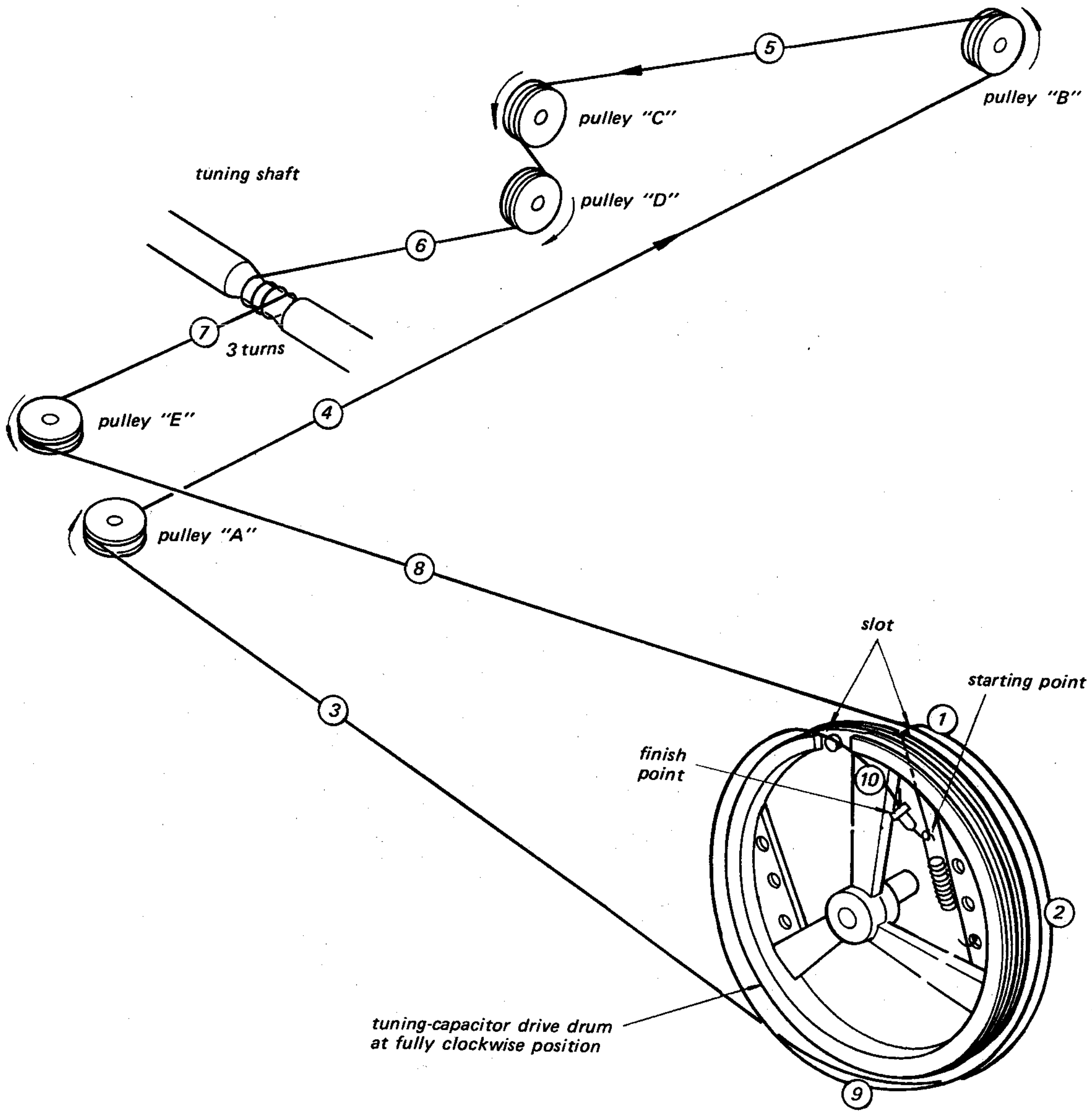
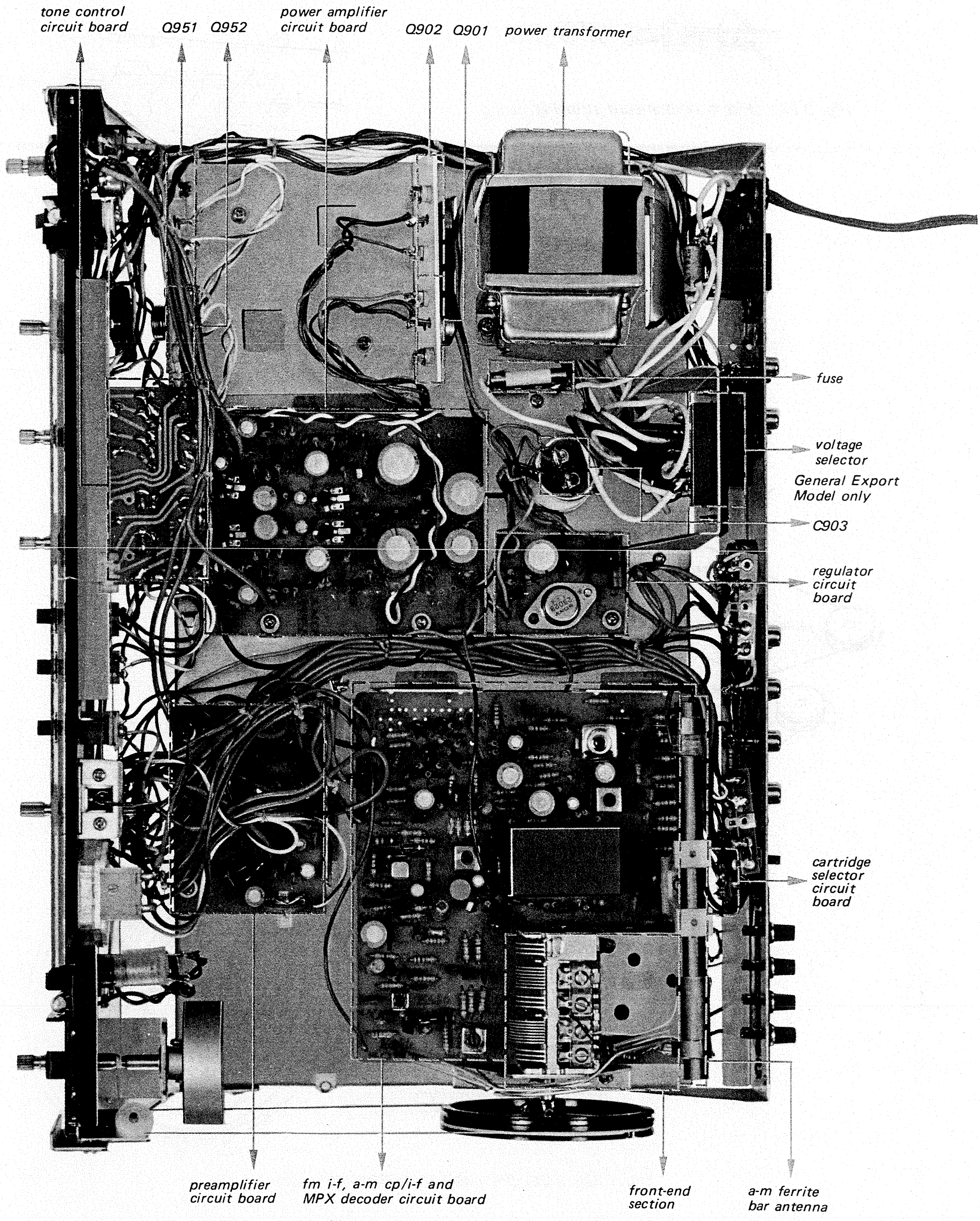

pulley "B"
⑤
pulley "C"
pulley "D"
tuning shaft
⑥
⑦
3 turns
pulley "E"
④
pulley "A"
⑧
slot
starting point
①
③
finish point
⑩
②
tuning-capacitor drive drum at fully clockwise position
⑨

*Fig. 2-31 Complete dial cord stringing*

## CHASSIS LAYOUT


tone control circuit board
Q951
Q952
power amplifier circuit board
Q902
Q901
power transformer
fuse
voltage selector
General Export Model only
C903
regulator circuit board
cartridge selector circuit board
preamplifier circuit board
fm i-f, a-m cp/i-f and MPX decoder circuit board
front-end section
a-m ferrite bar antenna

# SECTION 3
## REPACKING

The STR-222's original shipping carton and packing materials are the ideal container for shipping the unit. However to secure the maximum protection, the STR-222 must be repacked in these materials precisely as before. The proper repacking procedure is shown in Fig. 3-1.

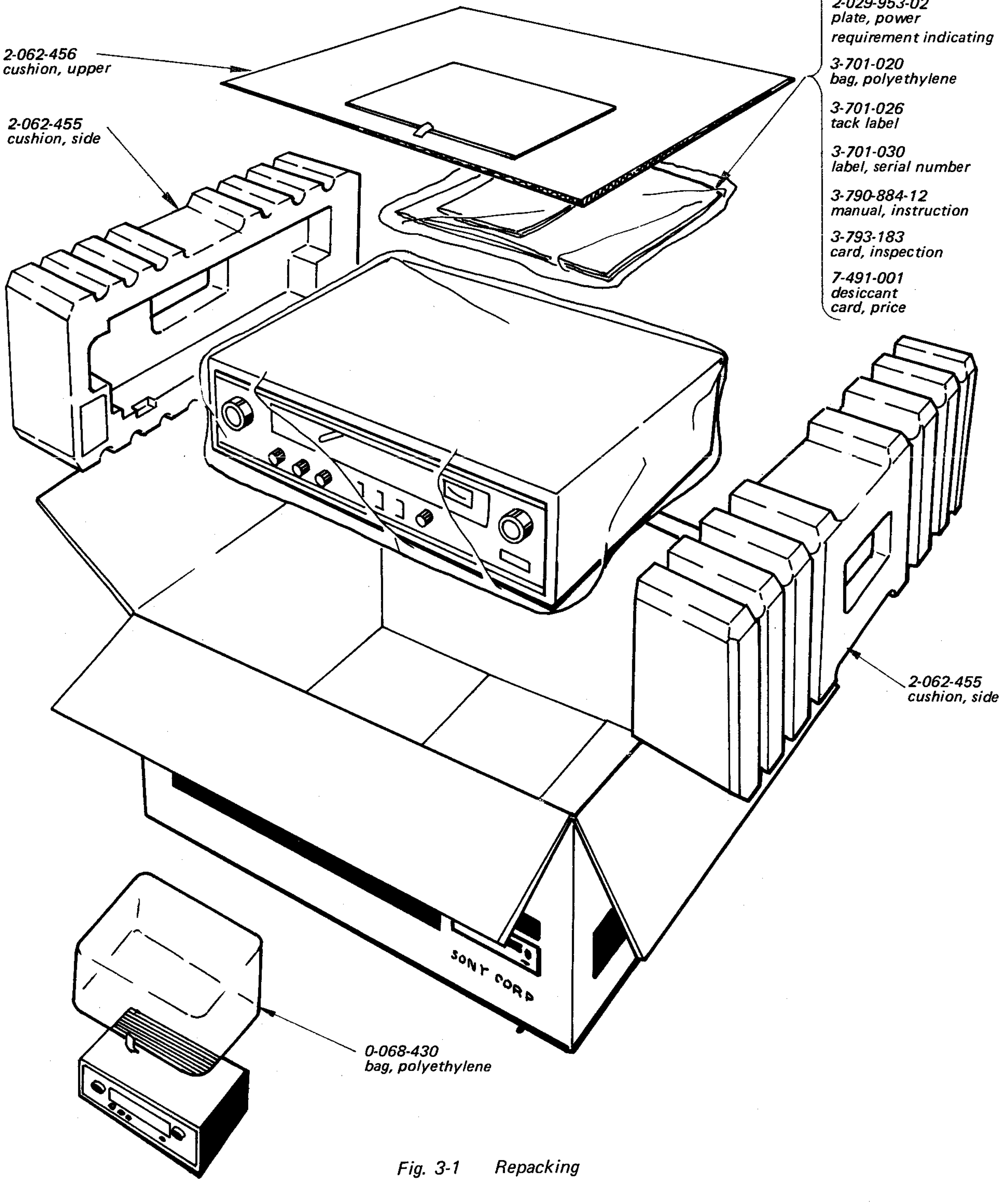

X-44900-02
cloth, polishing
1-501-083-21
ribbon antenna, fm
1-534-436-14 red
-24 white
connection cord,
speaker (RK-77)
2-029-953-02
plate, power
requirement indicating
3-701-020
bag, polyethylene
3-701-026
tack label
3-701-030
label, serial number
3-790-884-12
manual, instruction
3-793-183
card, inspection
7-491-001
desiccant
card, price
2-062-456
cushion, upper
2-062-455
cushion, side
2-062-455
cushion, side
SONY CORP
0-068-430
bag, polyethylene

*Fig. 3-1 Repacking*

# SECTION 4
# ALIGNMENT AND ADJUSTMENT PROCEDURES

## 4-1. FM I-F STRIP ALIGNMENT

### CAUTION

The ceramic filters in the fm i-f circuit are selected according to their specified center frequencies and color coded as shown in Fig. 4-1 and listed in Table 4-1. Check the color code of the filters to identify the same center frequency when replacing any of these filters.

**TABLE 4-1. FM I-F CERAMIC FILTERS**

| Part No. | Color | Specified Center Freq. |
|---|---|---|
| 1-403-562-11 | red | 10.70 MHz |
| 1-403-562-21 | black | 10.66 MHz |
| 1-403-562-31 | white | 10.74 MHz |
| 1-403-562-41 | green | 10.62 MHz |
| 1-403-562-51 | yellow | 10.78 MHz |

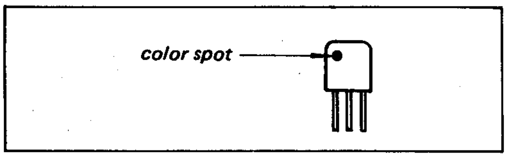


*Fig. 4-1 Fm i-f ceramic filter*

*Test Equipment Required*

1. Standard fm signal generator
2. Ac VTVM
3. Alignment tools
4. 300Ω balanced dummy antenna See Fig. 4-2.

**Note:** Fm i-f strip alignment should be performed only after replacing IFT101 in the front end.

*Preparation*

1. Remove the wooden case as described in Procedure 2-3.
2. Connect the input cable of the ac VTVM to the REC OUT terminal.
3. Connect the signal-generator's output to the fm antenna terminal through the 300 Ω balanced dummy antenna.

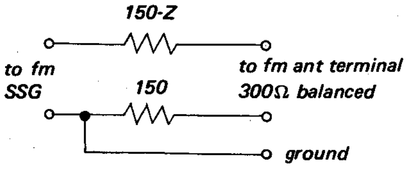
*Procedure*

1. With the equipment connected as shown in Fig. 4-3, set the signal-generator's controls as follows:

   Carrier frequency .......... 98 MHz
   Modulation ..................... Fm, 400 Hz 100%
   Output level .................. 60 μV (36 dB)

2. Set the receiver's controls as follows:

   FUNCTION switch ......... FM AUTO STEREO
   MODE switch ................. MONO



*Z: output impedance of SSG*

*Fig. 4-2 Fm i-f strip alignment test setup*

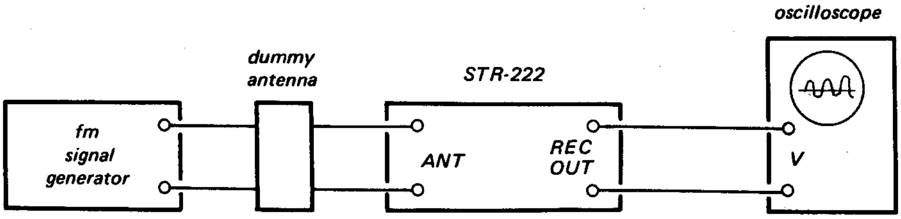


*Fig. 4-3 300-ohm balanced dummy antenna*

3. Turn the core of transformer IFT101 (See Fig. 4-11) with the alignment tool to obtain the maximum output.

## 4-2. FM DISCRIMINATOR ALIGNMENT

**Note:** Two methods of discriminator alignment are available, sweep generator alignment and signal generator alignment. You can use either of them.

### Sweep Generator Alignment

*Test Equipment Required*

1. 10.7 MHz sweep generator
2. Oscilloscope
3. Mylar capacitor, 0.02 μF
4. Alignment tools

*Preparation*

1. Remove the wooden case as described in Procedure 2-3.
2. Connect the input cable of the oscilloscope to R223 and ground on the fm a-m tuner circuit board with alligator clips, and solder a 0.02 μF mylar capacitor across these clips, as shown in Fig. 4-4.
3. Unsolder the shield cover of CV103.
4. Connect the output cable of the sweep generator across CV103 on the fm a-m tuner circuit board. Use alligator clips and make the connection through a 0.02 μF coupling capacitor as shown in Fig. 4-5.

*Procedure*

1. With the equipment connected as shown in Fig. 4-6, set the sweep generator's controls as follows:

Center frequency ............ 10.7 MHz
Sweep width .................. 1 MHz

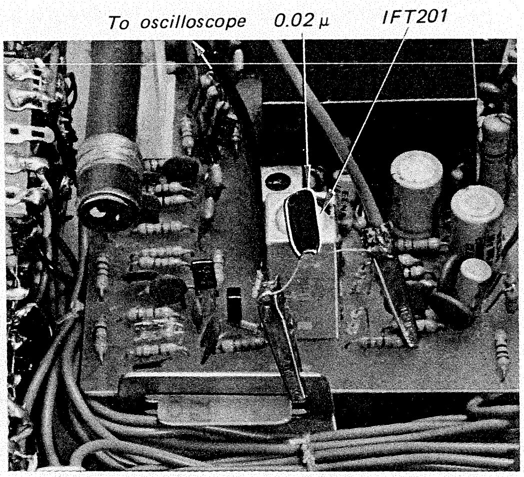


*Fig. 4-4 Discriminator output connection*

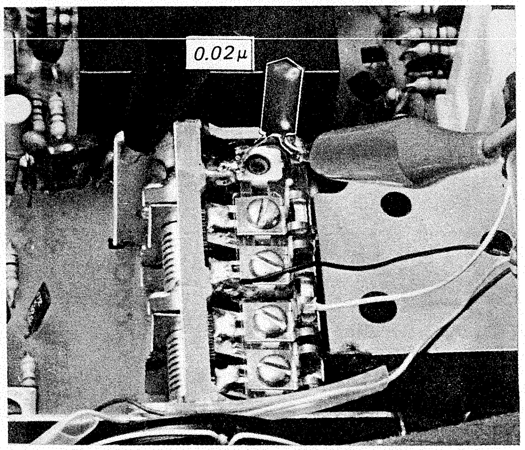


*Fig. 4-5 10.7 MHz signal injection*

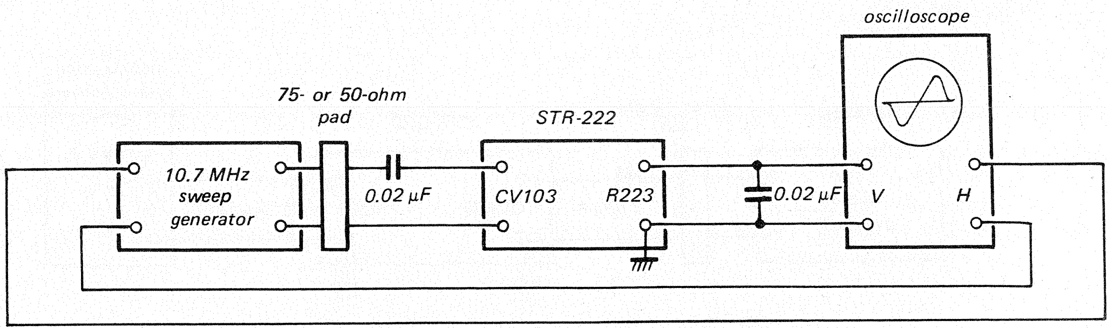


*Fig. 4-6 Fm discriminator alignment by sweep generator test setup*

2. Set the receiver's controls as follows:

   FUNCTION switch .......... FM AUTO STEREO
   VOLUME control .......... Minimum
   MODE switch .................. MONO

3. Adjust the controls of the oscilloscope to provide a visible indication.

   **Note:** Two or three traces will be observed on the oscilloscope as the center frequency of the sweep generator varies. The trace you are looking for has the largest amplitude. Once you get it, decrease the sweep generator output as low as possible.

4. Turn the top core (secondary side) of discriminator transformer IFT201 with an alignment tool to obtain the "S" curve response, and equalize the positive and negative peaks of the "S" curve response as shown in Fig. 4-4 and Fig. 4-7.

   **Note:** Do not turn the bottom core (primary side) of IFT201.

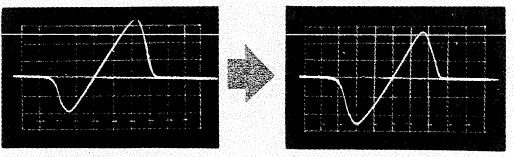


*Fig. 4-7 "S" curve response*

## Signal Generator Alignment

*Test Equipment Required*

1. Standard signal generator which can generate a 10.7 MHz a-m signal.
2. Oscilloscope
   Vertical sensitivity ............. 100 mV/cm minimum
3. Alignment tools

*Preparation*

Same as described for the sweep generator method.

*Procedure*

1. With the equipment connected as shown in Fig. 4-8, set the signal-generator's controls as follows:

   Frequency ........... Specified frequency of ceramic filter. See TABLE 4-1.
   Modulation .......... A-m, 400 Hz, 80%
   Output level .......... 10,000 $\mu$V (80 dB)

2. Set the tuner's FUNCTION switch to FM AUTO STEREO.
3. Adjust the oscilloscope controls for maximum sensitivity.
4. If the discriminator transformer IFT201 is not aligned correctly, 400 Hz ripple will be observed as shown in Fig. 4-9.
5. Turn the top core of transformer IFT201 with a hex-head alignment tool to obtain a minimum indication on the oscilloscope as shown in Fig. 4-9.

   **Note:** (1) Turn the core carefully and slowly because the output appearing on the oscilloscope jumps up and down when turning the core. This might cause difficulty in determining the point of minimum output.

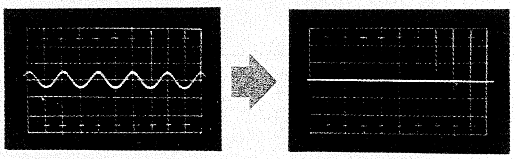


*Fig. 4-9 Fm discriminator alignment output response*

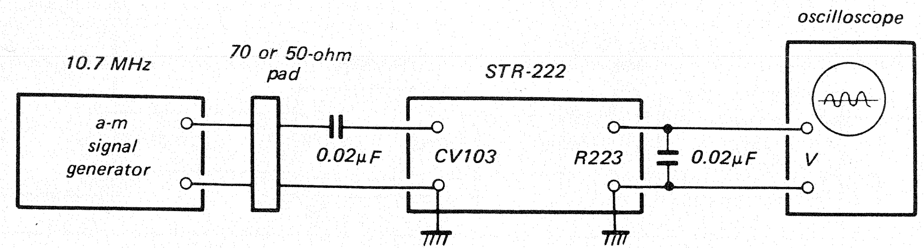


*Fig. 4-8 Test setup fm discriminator alignment by rf signal generator method*

(2) At both extreme positions of the top core, decreased output will be observed. The real null point should be obtained in the middle of the core thread length, and maximum output occurs at each side of the true null point.

## 4-3. FM FRONT-END ALIGNMENT
(Frequency coverage)

Never attempt alignment of the front-end section except for the frequency-coverage and dial-calibration adjustments. The front-end section of the tuner has been carefully adjusted at the factory, so very little adjustment is necessary in the field. Alignment need not be performed when the front-end FET is replaced since changes in FET parameters have little effect upon tuning.

**Note:** Before starting this alignment, the discriminator-transformer alignment should be performed.

*Test Equipment Required*

1. Standard fm signal generator
2. Ac VTVM
3. 300Ω balanced dummy antenna (See Fig. 4-2).
4. Alignment tools

*Preparation*

1. Remove the wooden case as described in Procedure 2-3 on pages 9 to 10.
2. Remove the tuner and MPX board as described in Procedure 2-8 and disconnect the connection point of R116 and R332 on the AFC circuit board as shown in Fig. 4-10.
3. Connect the equipment as shown in Fig. 4-3.
4. Set the receiver's controls as follows:

BAND selector ..................... FM
MODE switch ..................... MONO

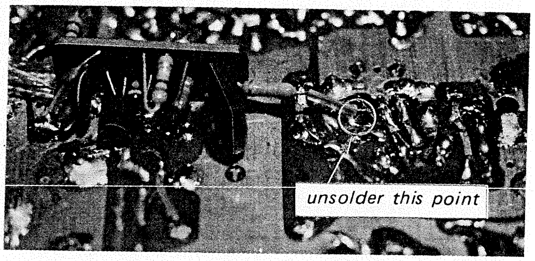


*Fig. 4-10 Afc circuit connection point*

**TABLE 4-2. FM FREQUENCY COVERAGE ADJUSTMENT**

| Step | Coupling Between Front End and S S G | SSG Frequency and Output Level | Tuning Capacitor | Scope Connection | Adjust | Indication |
|---|---|---|---|---|---|---|
| 1. | Dummy antenna<br>See Fig. 4-2 | 86 MHz<br>400 Hz<br>30 % Mod.<br>10 $\mu$V (20 dB)* | Maximum-capacitance position | REC OUT J908 | OSC coil L103<br>See Fig. 4-11 | Maximum |
| 2. | Same as above | 109.5 MHz<br>400 Hz<br>30 % Mod.<br>10 $\mu$V (20 dB) | Minimum-capacitance position | Same as above | OSC trimmer CT103<br>See Fig. 4-11 | Same as above |

*Generator Alignment*

Follow the procedures given in Table 4-2 when performing this alignment with an fm signal generator.

*Off-the-Air Alignment*

Accurate dial calibration and a frequency-coverage test can also be performed by utilizing off-the-air local fm signals. However, before performing the following procedure, be sure that the dial scale is correctly positioned, as described in Procedure 2-8.

*Procedure*

1. Tune the receiver to the lowest-frequency station.
2. Check the dial scale for a calibration accuracy of ±300 kHz from the carrier frequency of the station. If the dial-accuracy deviation exceeds this limit, turn the local-oscillator coil L103 slightly as shown in Fig. 4-11 until optimum dial calibration is obtained.
3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer CT103 to obtain maximum calibration accuracy.

## 4-4. FM STEREO SEPARATION ADJUSTMENT

*Preparation*

Before starting the stereo-separation adjustment, check and adjust the phase between the 19 kHz pilot signal and the sub-channel signal in the MPX stereo generator as follows:

(1) With the equipment connected as shown in Fig. 4-12, set the MPX and audio signal-generator's control as follows:

MAIN CHANNEL .................. OFF
SUB CHANNEL ...................... ON
PILOT (19 kHz) ..................... OFF
AUDIO OSCILLATOR
OUTPUT ................................ 400 Hz, 250 mV

(2) Adjust the oscilloscope controls to obtain a visible indication. Be sure the scope's horizontal display switch is set for external input.

(3) Turn the pilot-signal (19 kHz) phase control to obtain an in-phase and stable lissajous pattern as shown in Fig. 4-13.

*Procedure*

1. Connect the equipment as shown in Fig. 4-14.

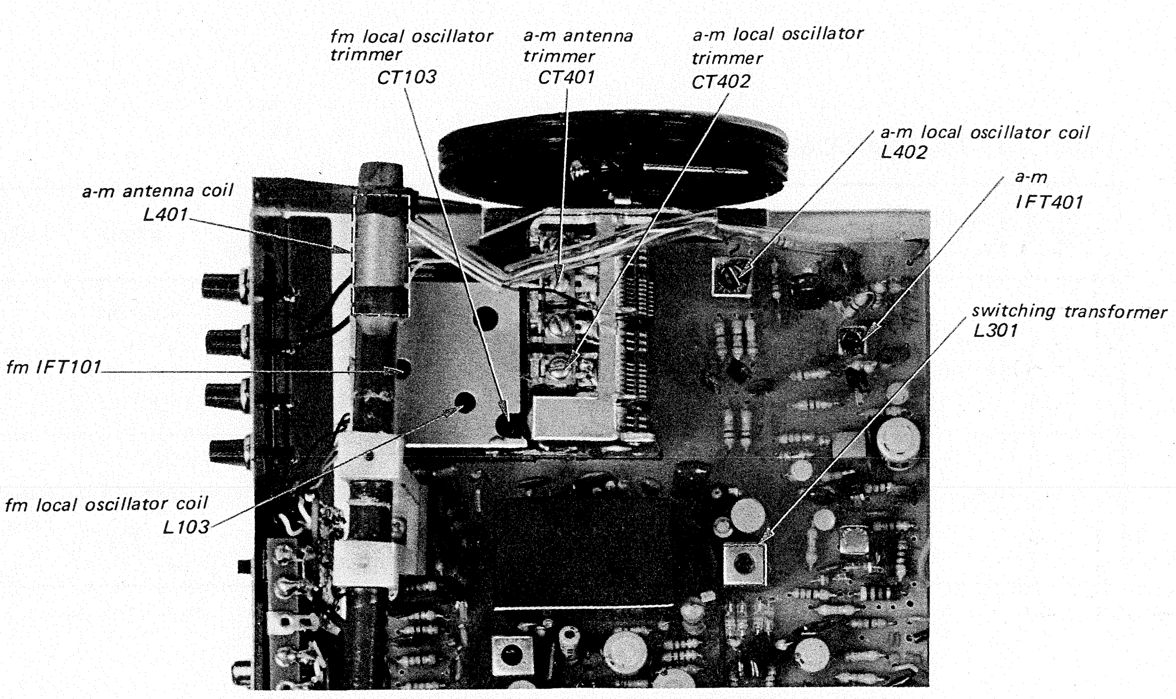

fm local oscillator trimmer CT103
a-m antenna trimmer CT401
a-m local oscillator trimmer CT402
a-m local oscillator coil L402
a-m IFT401
a-m antenna coil L401
switching transformer L301
fm IFT101
fm local oscillator coil L103

Fig. 4-11 Parts location

Set the fm signal-generator's control as follows:

Carrier frequency ................ 98 MHz
Output level ...................... 1,000 $\mu$V (60 dB)

Modulation:

Main channel (400 Hz) ..........33.75 kHz (45%)
Sub channel (38 kHz) ......... 33.75 kHz (45%)
Pilot (19 kHz) .................... 7.5 kHz (10%)

The above mentioned modulation levels can be set as follows:

(a) With the equipment connected as shown in Fig. 4-14, set the MPX stereo generator controls as follows:

MAIN CHANNEL .................... OFF
SUB CHANNEL ...................... OFF
19 kHz (PILOT) ..................... ON

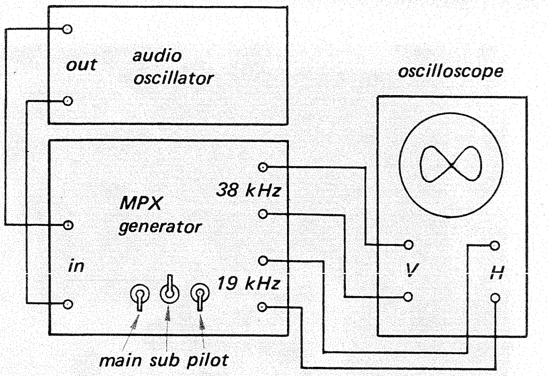

out
audio oscillator
oscilloscope
MPX generator
38 kHz
in
19 kHz
V
H
main sub pilot

*Fig. 4-12 Test setup for the MPX generator preadjustment*

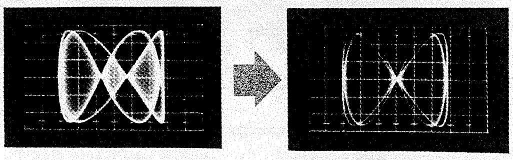


*Fig. 4-13 Lissajous pattern*

(b) Adjust the 19 kHz signal level to obtain a 7.5 kHz deviation on the FM SSG modulation indicator.

(c) Reset the MPX stereo-generator's controls as follows:

MAIN CHANNEL .................. ON
SUB CHANNEL ...................... OFF
19 kHz (PILOT) ..................... OFF
INPUT SELECTOR .................. L-CH

(d) Adjust the audio-oscillator output (400 Hz) to obtain a 33.75 kHz deviation on the FM SSG modulation indicator.

(e) Set all controls to the ON position.

2. Turn the top core of switching transformer L301, to obtain maximum output at the left channel. See Fig. 4-15. Note that this adjustment has a close relationship with stereo distortion.

3. Record the output level of the left channel when the MPX generator input selector is set to the left channel.

4. Switch the input selector to the right channel and read the residual signal level in the left channel.

5. The output-level to residual-level ratio represents the separation. Adjust separation adj. control RV551 (see Fig. 4-15) for minimum residual level. Check the right channel for separation. Usually, about an 8 to 9 dB difference in channel separation exists. Readjust RV551 for minimum difference between left- and right-channel separation. While doing this, remember that the output level also changes according to the setting of RV551.

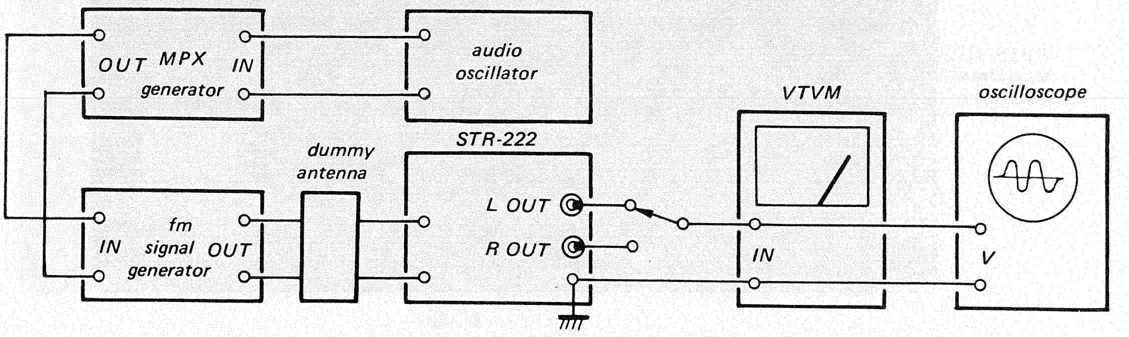

OUT MPX IN
generator
audio oscillator
dummy antenna
STR-222
L OUT
R OUT
fm
IN signal OUT
generator
VTVM
IN
oscilloscope
V

*Fig. 4-14 Fm stereo separation adjustment test setup*

## 4-5. A-M I-F STRIP ALIGNMENT

*Preparation*

Remove the wooden case as described in Procedure 2-3. Then set the receiver's FUNCTION selector to AM.

### Sweep Generator Alignment

1. Connect the sweep generator's output across CV402 (variable capacitor) through a 50 or 75 ohm pad, as shown in Fig. 4-16.
2. Connect the input cable of the oscilloscope to R419 and ground on the tuner and MPX circuit board with alligator clips as shown in Fig. 4-17.
3. With the equipment connected as shown in Fig. 4-19, adjust the oscilloscope controls and generator output to provide a visible indication.
4. Turn the top core of IFT401 (see Fig. 4-15) to obtain a maximum and symmetrical response as shown in Fig. 4-18.

### Rf Signal Generator Method

1. Set the rf signal generator's controls as follows:

   Modulation ........................ INTERNAL
   Frequency .......................... 455 kHz
   OUTPUT level .................. 1,000 $\mu$V

2. Connect the rf signal-generator's output across CV402 (variable capacitor) through 50 or 75 ohm pad, as shown in Fig. 4-16.
3. With the equipment connected as shown in Fig. 4-20, turn the top core of IFT401 (see Fig. 4-15) to obtain the maximum output.

## 4-6. A-M FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

*Preparation*

Remove the wooden case as described in Procedure 2-3. Then, set the tuner's BAND selector to AM.

*Signal Generator Method*

With the equipment connected as shown in Fig. 4-21, follow the procedures given in Tables 4-3 and 4-4 when performing this alignment with an a-m signal generator.

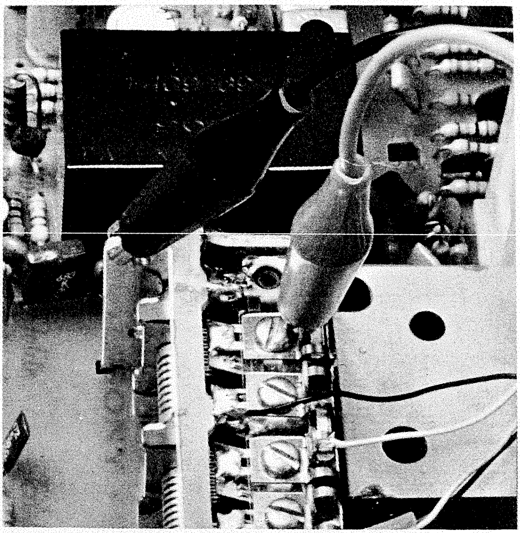


*Fig. 4-16 455 kHz signal injection*

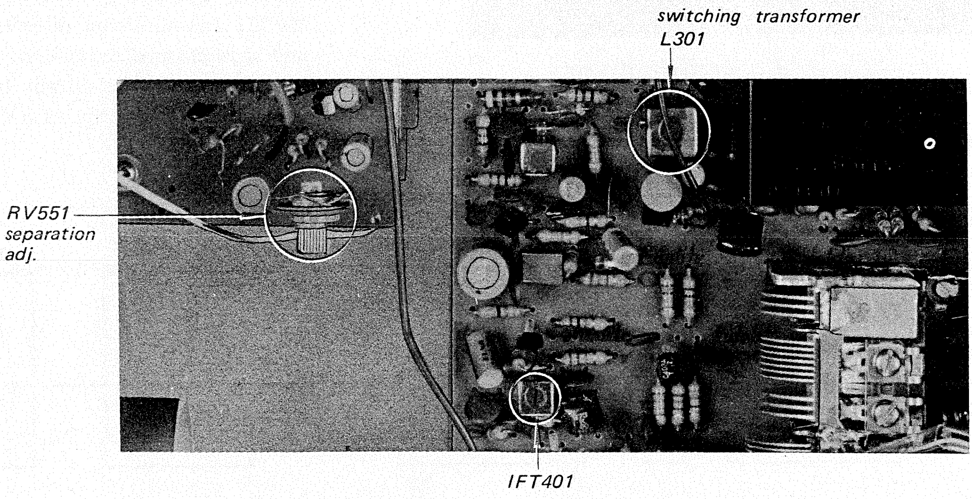


*Fig. 4-15 Parts location*

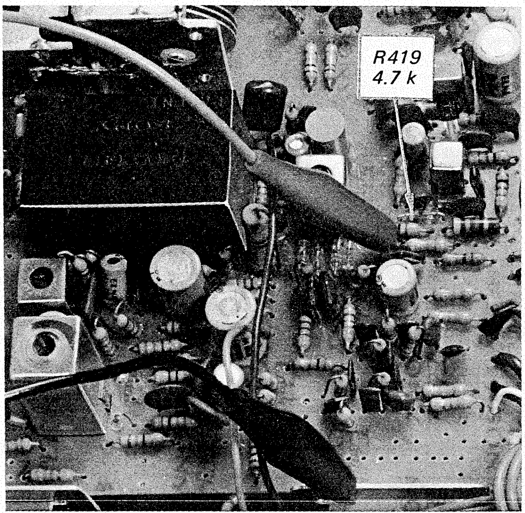


Fig. 4-17 Detector output connection

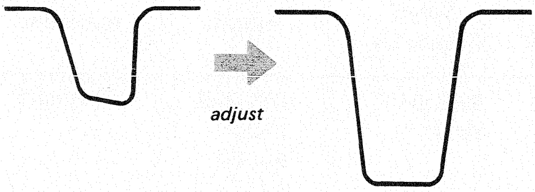


Fig. 4-18 A-m i-f response

*Off-the-Air Signal Method*

Accurate dial calibration, and a frequency-coverage and tracking test can also be performed by utilizing off-the-air local a-m signals. However, before performing the following procedure, be sure that the dial scale is correctly positioned, as in the Procedure 2-10.

*Frequency Coverage Adjustment*

1. Tune the receiver to the lowest-frequency station.
2. Check the dial scale for a calibration accuracy of 20 kHz from the carrier frequency of the lowest and 35 kHz at the highest station. If the dial-accuracy deviation exceeds this limit, turn the local oscillator-coil L402 as shown in Fig. 4-11, slightly until optimum dial calibration is obtained.
3. Tune the receiver to the highest-frequency station in your locality. If the dial-calibration error is excessive, adjust local-oscillator trimmer-capacitor CT402 (see Fig. 4-11) to obtain maximum calibration accuracy.

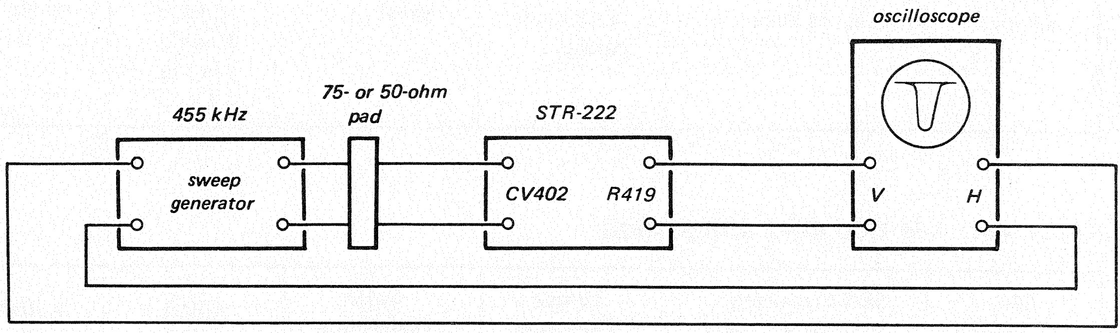

oscilloscope
75- or 50-ohm pad
455 kHz
STR-222
sweep generator
CV402
R419
V
H

Fig. 4-19 A-m i-f alignment by sweep generator test setup

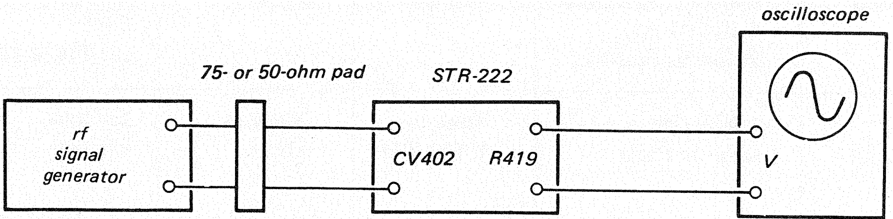

oscilloscope
75- or 50-ohm pad
STR-222
rf signal generator
CV402
R419
V

Fig. 4-20 Test setup a-m i-f alignment by rf signal generator

*Tracking Adjustment*

1. Tune the set to the station whose carrier frequency is closest to 620 kHz and adjust the position of antenna coil L401 as shown in Fig. 4-11 to obtain maximum output.
2. Tune the set to the station whose carrier frequency is closest to 1,400 kHz and adjust the antenna trimmer CT401 to obtain a maximum output. See Fig. 4-11.
3. Repeat the above steps two or three times.

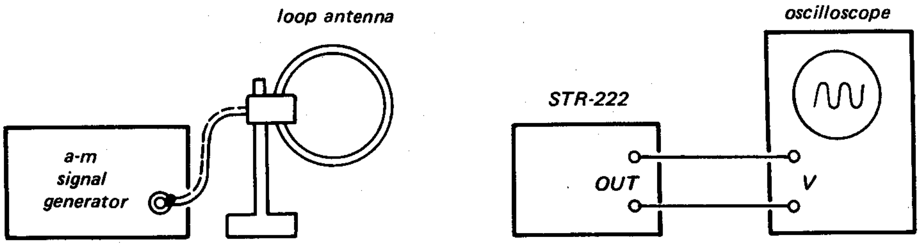


*Fig. 4-21 A-m frequency coverage and tracking adjustment test setup*

**TABLE 4-3. A-M FREQUENCY COVERAGE ADJUSTMENT**

| SSG Coupling | SSG Frequency and Output Level | Tuning Capacitor | Scope Connection | Adjust | Indication |
|---|---|---|---|---|---|
| Loop antenna | 520 kHz<br>400 Hz<br>30% Mod.<br>3,000 μV (70 dB) | Maximum-capacitance position | REC OUT J908 | OSC coil L402<br>See Fig. 4-11 | Maximum |
| Loop antenna | 1,680 kHz<br>same as above | Minimum-capacitance position | Same as above | OSC trimmer CT402<br>See Fig. 4-11 | Same as above |

**TABLE 4-4. A-M TRACKING ADJUSTMENT**

| SSG Coupling | SSG Frequency and Output Level | Tuning Capacitor | Scope Connection | Adjust | Indication |
|---|---|---|---|---|---|
| Loop antenna | 620 kHz<br>400 Hz 30% Mod.<br>Output Level as low as possible | Tune to 620 kHz | REC OUT J908 | Position of antenna coil L401<br>See Fig. 4-11 | Maximum |
| Loop antenna | 1,400 kHz<br>same as above | Tune to 1,400 kHz | Same as above | Antenna trimmer CT401<br>See Fig. 4-11 | Same as above |

## 4-7. POWER-AMPLIFIER ADJUSTMENT

**Note:** There are two adjustment items in the power amplifier. One is dc-bias adjustment and the other is ac-balance adjustment. These adjustments should be alternately repeated two or three times after replacing any of the power-amplifier transistors until the best operation is obtained.

### *Dc-Bias Adjustment*

Serious deficiencies in performance, such as thermal runaway of power transistors, will result if this adjustment is improperly set.

#### CAUTION

To avoid accidental power transistor damage, increase the ac line voltage gradually, using a variable transformer, while measuring the voltage across emitter resistor R721 or emitter of Q902 and ground. See Fig. 4-22. Check to see that the reading does not exceed 25 mV. If it does, turn off the power as soon as possible, then check and repair the trouble in the power-amplifier board.

### *Test Equipment Required*

1. Dc millivoltmeter
2. Variable transformer
3. Screwdriver with 1/8" (3 mm) blade

### *Preparation*

1. Remove the wooden case as described in Procedure 2-3.
2. Connect the dc millivoltmeter between the emitter of Q902 (Q952) and ground, as shown in Fig. 4-22.

### *Procedure*

1. Set the semi-fixed resistors (Fig. 4-23) on the power-amplifier board as follows:

   RV702(L-CH) (dc bias) ....... counterclockwise
   RV752(R-CH) (dc bias) ........ counterclockwise
   RV701 and RV751
   (ac balance) ....................... mid-position

2. Set the variable transformer for minimum output.
3. Turn on the POWER switch, then increase the line voltage up to the rated value.
4. Adjust RV702 and RV752 to obtain a 25 mV reading on the meter.
5. After completing the adjustment, apply a drop of lock paint to RV702 and RV752.

### *Ac-Balance Adjustment*

Excessive harmonic distortion at high levels will result if this adjustment is improperly set.

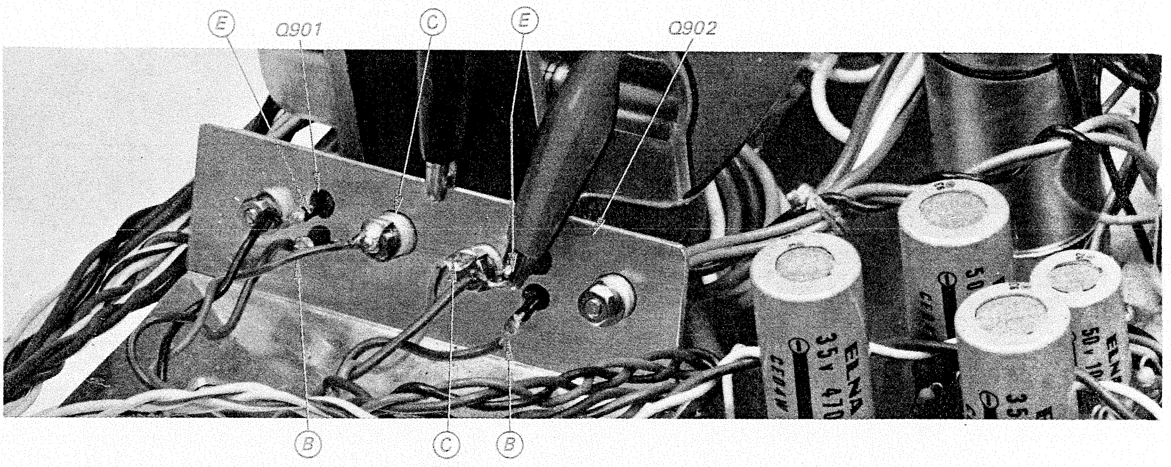


*Fig. 4-22 Connection of dc voltmeter*

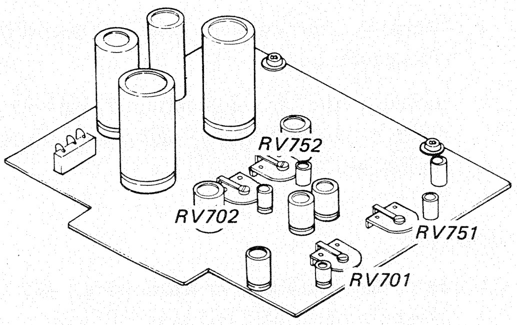

RV752
RV702
RV751
RV701

*Fig. 4-23 Location of semi-fixed resistors*

*Test Equipment Required*

1. Audio oscillator
2. Attenuator
3. Oscilloscope
4. Resistor, 600 ohms 1/4 W
5. Dummy load, 8 ohms 10 W
6. Screwdriver with 1/8" blade

*Preparation*

Set the receiver's control as follows:

| | |
|---|---|
| FUNCTION selector | TAPE |
| MODE selector | MONO |
| VOLUME control | minimum |

*Procedure*

1. With the equipment connected as shown in Fig. 4-24, set the POWER switch to ON and feed a 1 kHz, 0.775 V (0 dB) signal to the TAPE input jack through the attenuator.
2. While watching the waveform on the oscilloscope, alternately turn the VOLUME control and adjust RV701(RV751). Set RV701(RV751) so that the positive and negative peaks of the output waveform are simultaneously clipped (as shown in Fig. 4-25) when increasing the VOLUME control just beyond the point that causes distortion.
3. After completing the adjustment, apply a drop of lock paint to RV701 (RV751).

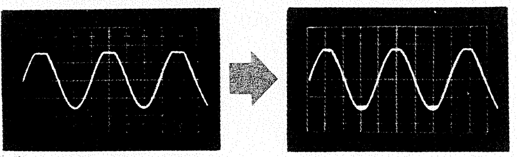


*Fig. 4-25 Output waveform of ac balance adjustment*

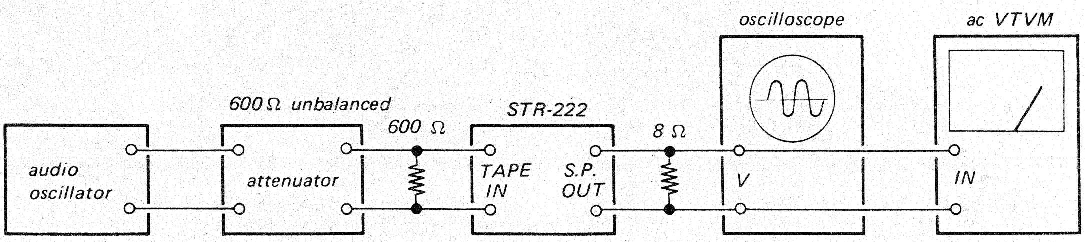
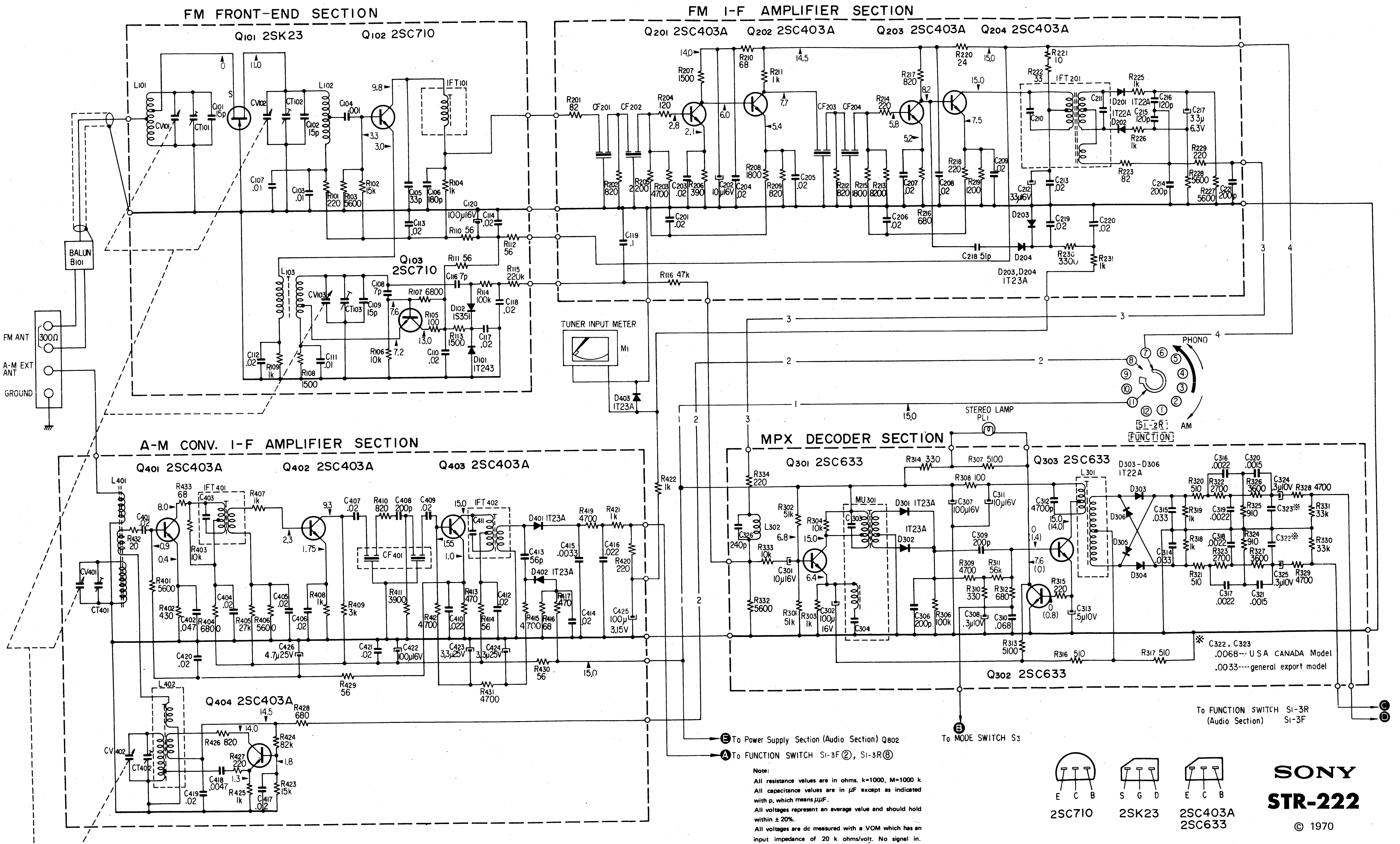

oscilloscope
ac VTVM
600Ω unbalanced
600 Ω
STR-222
8 Ω
audio oscillator
attenuator
TAPE IN
S.P. OUT
V
IN

*Fig. 4-24 Ac-balance adjustment test setup*

## SECTION 5
## DIAGRAMS

### 5-1. SCHEMATIC DIAGRAM – Tuner Section –


FM FRONT-END SECTION
Q101 2SK23
Q102 2SC710
Q103 2SC710
L101
L102
L103
CV101
CT101
CV102
CT102
CV103
CT103
IFT101
D101 IT243
D102 IS351
BALUN B101
FM ANT
300Ω
A-M EXT ANT
GROUND
FM I-F AMPLIFIER SECTION
Q201 2SC403A
Q202 2SC403A
Q203 2SC403A
Q204 2SC403A
CF201
CF202
CF203
CF204
IFT201
D201 IT22A
D202 IT22A
D203, D204 IT23A
TUNER INPUT METER
M1
D403 IT23A
PHONO
AM
S1-2R
FUNCTION
STEREO LAMP
PL1
A-M CONV. I-F AMPLIFIER SECTION
Q401 2SC403A
Q402 2SC403A
Q403 2SC403A
Q404 2SC403A
L401
L402
CV401
CT401
CV402
CT402
IFT401
IFT402
CF401
D401 IT23A
D402 IT23A
MPX DECODER SECTION
Q301 2SC633
Q302 2SC633
Q303 2SC633
MU301
L301
L302
D301 IT23A
D302 IT23A
D303-D306 IT22A
To FUNCTION SWITCH S1-3R (Audio Section) S1-3F
E To Power Supply Section (Audio Section) Q802
A To FUNCTION SWITCH S1-3F ②, S1-3R ⑧
B To MODE SWITCH S3
E C B
2SC710
S G D
2SK23
E C B
2SC403A
2SC633

※ C322, C323
.0068---U S A CANADA Model
.0033----general export model

Note:

All resistance values are in ohms. k=1000, M=1000 k

All capacitance values are in μF except as indicated with p, which means μμF.

All voltages represent an average value and should hold within ± 20%.

All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.

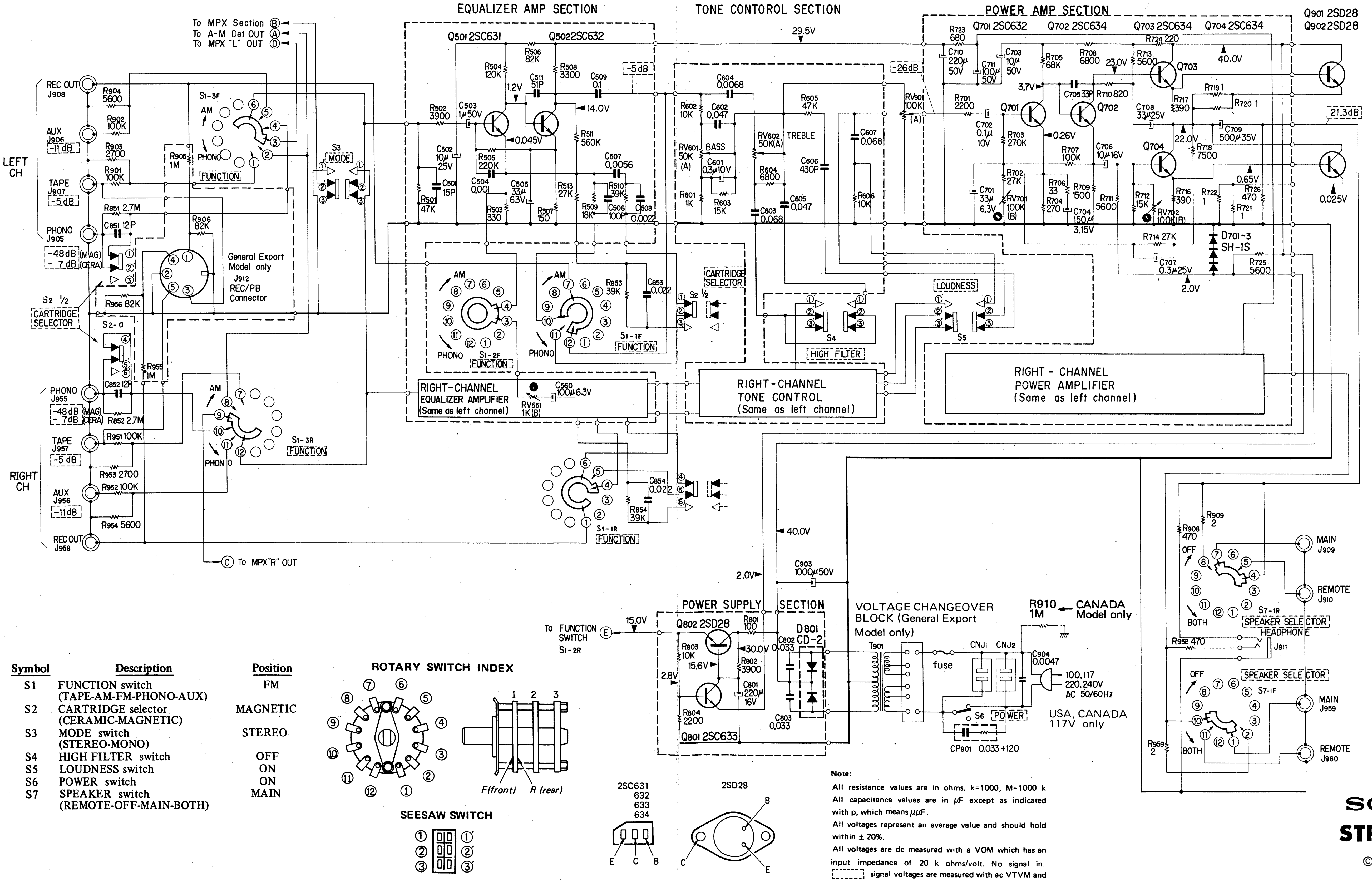
[-----] signal voltages are measured with ac VTVM and expressed in dBm refered to 0.775 volts, 1 kHz.

**SONY**

**STR-222**

© 1970

## 5-2. SCHEMATIC DIAGRAM – Audio Section –


EQUALIZER AMP SECTION
TONE CONTOROL SECTION
POWER AMP SECTION
To MPX Section Ⓑ
To A-M Det OUT Ⓐ
To MPX "L" OUT Ⓓ
LEFT CH
RIGHT CH
REC OUT J908
AUX J906 -11 dB
TAPE J907 -5 dB
PHONO J905 -48 dB (MAG) -7 dB (CERA)
R904 5600
R902 100K
R903 2700
R901 100K
R851 2.7M
C851 12P
R906 82K
R905 1M
S1-3F FUNCTION
S3 MODE
General Export Model only J912 REC/PB Connector
S2 ½ CARTRIDGE SELECTOR
S2-a
R956 82K
R955 1M
C852 12P
R852 2.7M
PHONO J955
TAPE J957 -5 dB
AUX J956 -11dB
REC OUT J958
R951 100K
R953 2700
R952 100K
R954 5600
S1-3R FUNCTION
Ⓒ To MPX "R" OUT
Q501 2SC631
Q502 2SC632
R506 82K
R504 120K
R508 3300
C509 0.1
-5dB
C511 51P
1.2V
14.0V
R502 3900
C503 1μ50V
0.045V
R511 560K
C502 10μ 25V
R505 220K
C507 0.0056
C501 15P
C504 0.001
C505 33μ 6.3V
R513 27K
R510 39K
R501 47K
R503 330
R507 150
R509 18K
C506 100P
C508 0.0022
S1-2F FUNCTION
S1-1F FUNCTION
R853 39K
C853 0.022
CARTRIDGE SELECTOR
S2 ½
RIGHT-CHANNEL EQUALIZER AMPLIFIER (Same as left channel)
C560 100μ 6.3V
RV551 1K (B)
C854 0.022
R854 39K
S1-1R FUNCTION
29.5V
C604 0.0068
R602 10K
C602 0.047
RV601 50K (A) BASS
C601 0.3μ 10V
R601 1K
R603 15K
RV602 50K(A) TREBLE
R604 6800
R605 47K
C607 0.068
C606 430P
C603 0.068
C605 0.047
R606 10K
-26dB
RV901 100K (A)
HIGH FILTER
S4
LOUDNESS
S5
RIGHT-CHANNEL TONE CONTROL (Same as left channel)
Q701 2SC632
Q702 2SC634
Q703 2SC634
Q704 2SC634
R723 680
C710 220μ 50V
C711 100μ 50V
C703 10μ 50V
R705 68K
R708 6800
23.0V
R724 220
R713 5600
40.0V
3.7V
C705 33P
R710 820
R701 2200
C702 0.1μ 10V
R703 270K
0.26V
R707 100K
C706 10μ 16V
C708 33μ 25V
R717 390
R719 1
R720 1
22.0V
C709 500μ 35V
R718 7500
R702 27K
C701 33μ 6.3V
RV701 100K (B)
R706 33
R704 270
R709 1500
C704 150μ 4V
3.15V
R711 5600
R712 15K
RV702 100K (B)
R716 390
R722 1
R721 1
0.65V
R726 470
R714 27K
C707 0.3μ 25V
D701-3 SH-1S
R725 5600
2.0V
RIGHT - CHANNEL POWER AMPLIFIER (Same as left channel)
Q901 2SD28
Q902 2SD28
21.3dB
0.025V
40.0V
2.0V
C903 1000μ 50V
POWER SUPPLY SECTION
To FUNCTION SWITCH S1-2R Ⓔ
15.0V
Q802 2SD28
R801 100
R803 10K
15.6V
30.0V
R802 3900
C802 0.033
D801 CD-2
C801 220μ 16V
2.8V
R804 2200
Q801 2SC633
C803 0.033
VOLTAGE CHANGEOVER BLOCK (General Export Model only)
T901
fuse
CNJ1 CNJ2
R910 1M ← CANADA Model only
C904 0.0047
100,117 220,240V AC 50/60Hz
USA, CANADA 117V only
S6 POWER
CP901 0.033+120
R909 2
R908 470
OFF
BOTH
S7-1R SPEAKER SELECTOR
MAIN J909
REMOTE J910
HEADPHONE J911
R958 470
S7-1F SPEAKER SELECTOR
MAIN J959
REMOTE J960
R959 2
ROTARY SWITCH INDEX
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫
1 2 3
F(front) R (rear)
SEESAW SWITCH
① ② ③ ①' ②' ③'
2SC631 632 633 634
E C B
2SD28
B C E

| Symbol | Description | Position |
|---|---|---|
| S1 | FUNCTION switch (TAPE-AM-FM-PHONO-AUX) | FM |
| S2 | CARTRIDGE selector (CERAMIC-MAGNETIC) | MAGNETIC |
| S3 | MODE switch (STEREO-MONO) | STEREO |
| S4 | HIGH FILTER switch | OFF |
| S5 | LOUDNESS switch | ON |
| S6 | POWER switch | ON |
| S7 | SPEAKER switch (REMOTE-OFF-MAIN-BOTH) | MAIN |

**Note:**

All resistance values are in ohms. k=1000, M=1000 k

All capacitance values are in μF except as indicated with p, which means μμF.

All voltages represent an average value and should hold within ± 20%.

All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.

┆┄┄┄┄┆ signal voltages are measured with ac VTVM and expressed in dBm refered to 0.775 volts, 1 kHz.

**SONY**

**STR-222**

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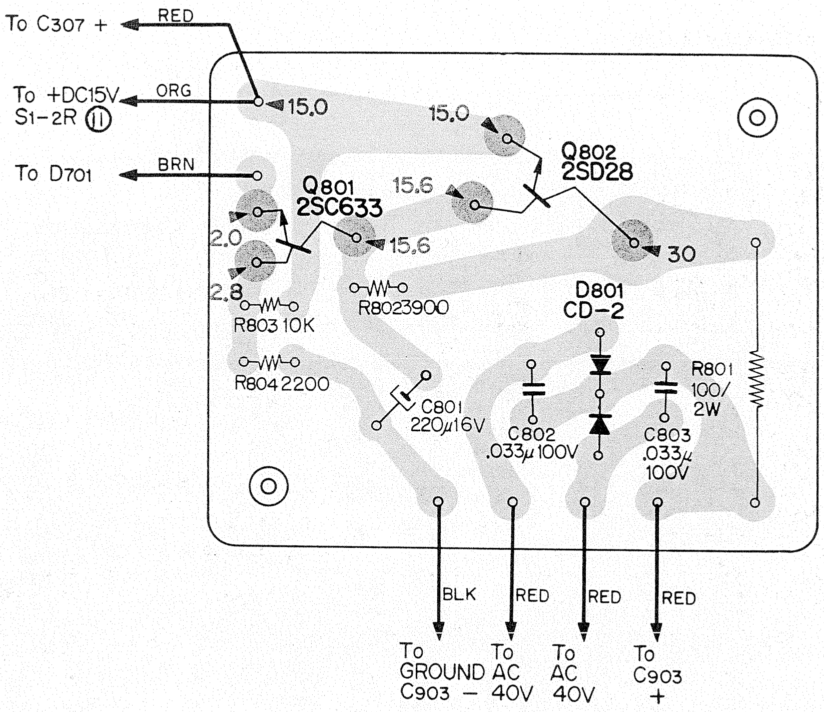
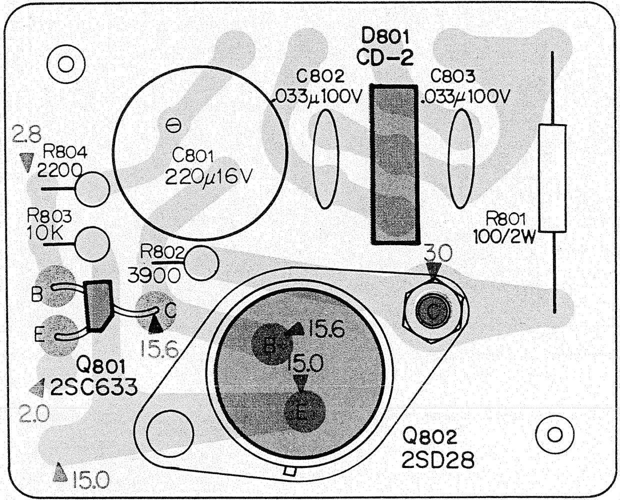
## 5-3. MOUNTING DIAGRAM — Power Supply —

— Conductor side —

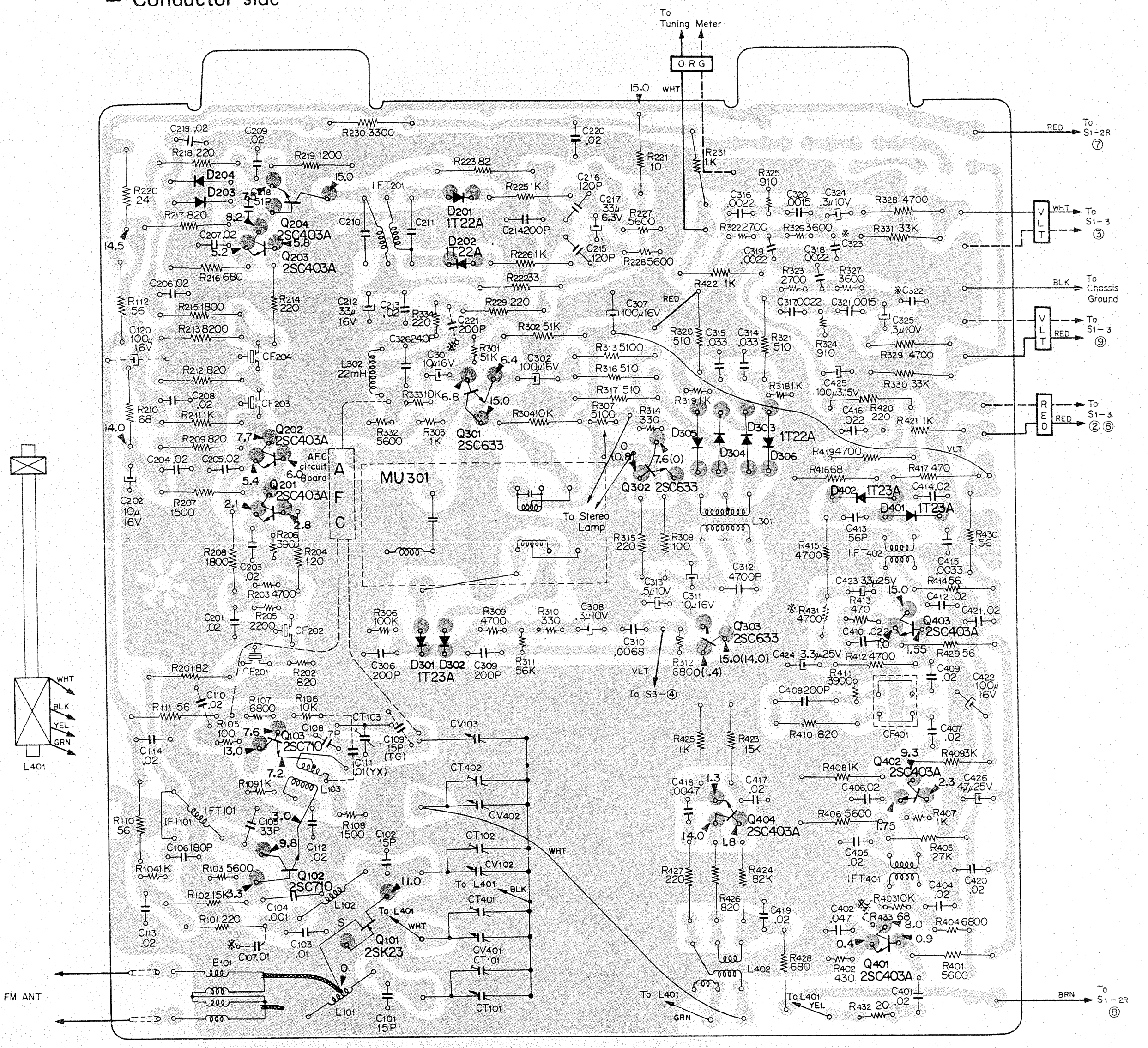

To C307 +
RED
To +DC15V
S1-2R ⑪
ORG
To D701
BRN
15.0
15.0
Q802
2SD28
Q801
2SC633
15.6
15.6
2.0
2.8
30
R803 10K
R802 3900
R804 2200
D801
CD-2
C801
220μ16V
C802
.033μ100V
C803
.033μ
100V
R801
100/
2W
BLK
RED
RED
RED
To
GROUND
C903 −
To
AC
40V
To
AC
40V
To
C903
+

— Component side —


D801
CD-2
C802
.033μ100V
C803
.033μ100V
2.8
R804
2200
C801
220μ16V
R801
100/2W
R803
10K
R802
3900
30
B
C
E
15.6
15.6
15.0
B
E
Q801
2SC633
2.0
Q802
2SD28
15.0

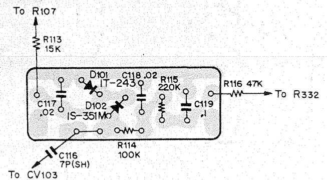
## 5-4. MOUNTING DIAGRAM – Tuner and MPX Board –

– Conductor side –


To Tuning Meter
ORG
WHT
15.0
To S1-2R ⑦
To S1-3 ③
To Chassis Ground
To S1-3 ⑨
To S1-3 ②⑧
To S1-2R ⑧
RED
BLK
BRN
VLT
MU301
AFC circuit Board
To Stereo Lamp
To S3-④
To L401
FM ANT
L401
WHT
BLK
YEL
GRN
Q101 2SK23
Q102 2SC710
Q103 2SC710
Q201 2SC403A
Q202 2SC403A
Q203 2SC403A
Q204 2SC403A
Q301 2SC633
Q302 2SC633
Q303 2SC633
Q401 2SC403A
Q402 2SC403A
Q403 2SC403A
Q404 2SC403A
D201 1T22A
D202 1T22A
D203
D204
D301 D302 1T23A
D303 1T22A
D304
D305
D306
D401 1T23A
D402 1T23A
IFT101
IFT201
IFT401
IFT402
CF201
CF202
CF203
CF204
CF401
CV102
CV103
CV401
CV402
CT101
CT102
CT103
CT401
CT402
L101
L102
L103
L301
L302 22mH
L402
B101

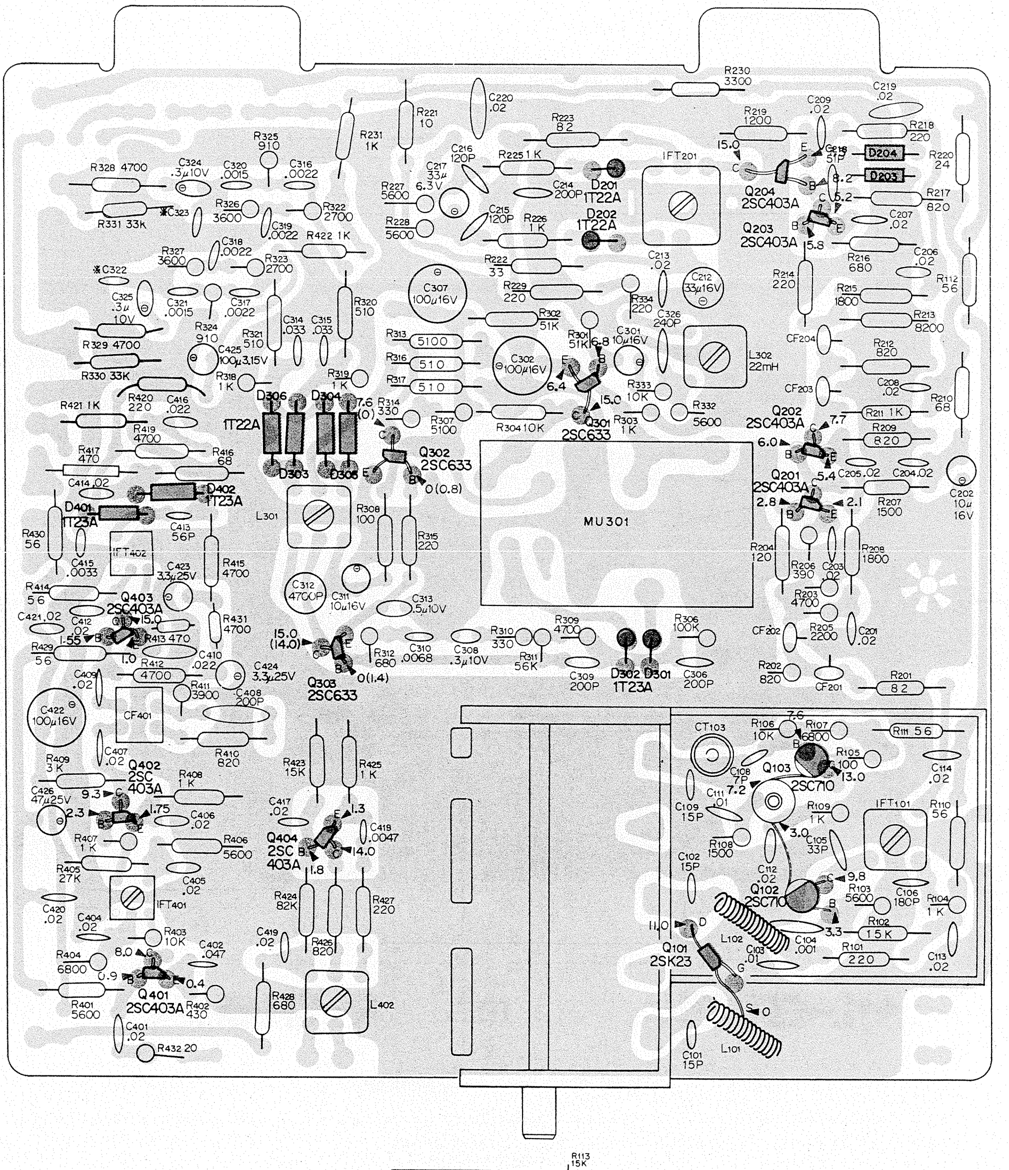
※ mounted on conductor side

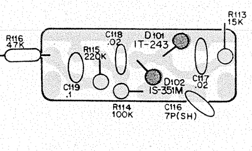
※ C322 C323
General Export Model----0.0033
USA CANADA Model-----0.0068


To R107
R113 15K
D101 1T-243
C118 .02
R115 220K
R116 47K
To R332
C117 .02
D102 1S-351M
C119 .1
R114 100K
C116 7P(SH)
To CV103

— AFC Board —

— Component side —

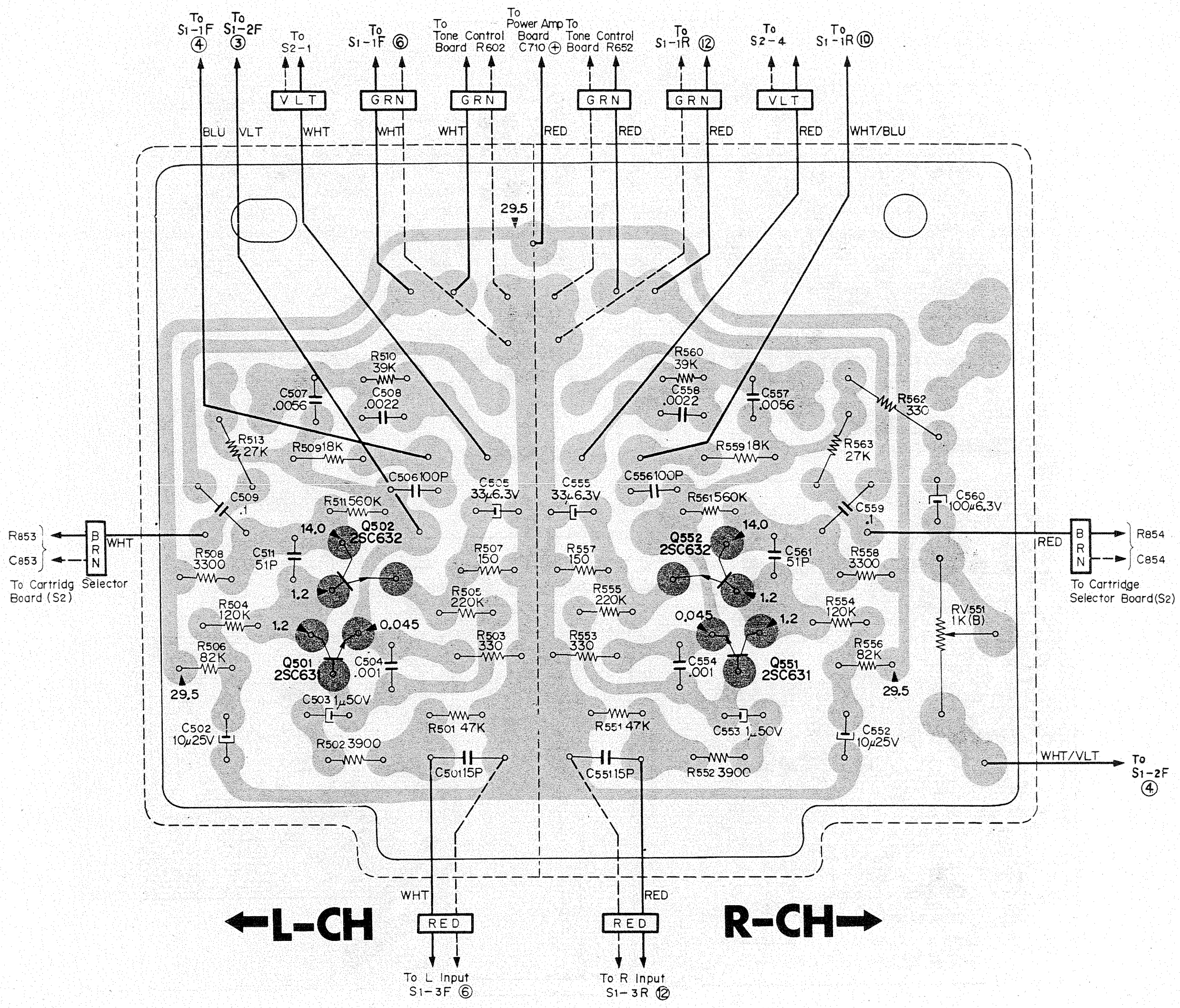

MU301
IFT201
IFT101
IFT401
IFT402
L301
L302 22mH
L402
L101
L102
CT103
CF401
CF201
CF202
CF203
CF204
Q101 2SK23
Q102 2SC710
Q103 2SC710
Q201 2SC403A
Q202 2SC403A
Q203 2SC403A
Q204 2SC403A
Q301 2SC633
Q302 2SC633
Q303 2SC633
Q401 2SC403A
Q402 2SC403A
Q403 2SC403A
Q404 2SC403A
D201 1T22A
D202 1T22A
D203
D204
D301 1T23A
D302 1T23A
D303
D304
D305
D306 1T22A
D401 1T23A
D402 1T23A
C302 100μ16V
C307 100μ16V
C422 100μ16V
R230 3300
R328 4700
R331 33K
R329 4700
R330 33K


R113 15K
R116 47K
C118 .02
D101 1T-243
R115 220K
C119 .1
D102 1S-351M
C117 .02
R114 100K
C116 7P(SH)

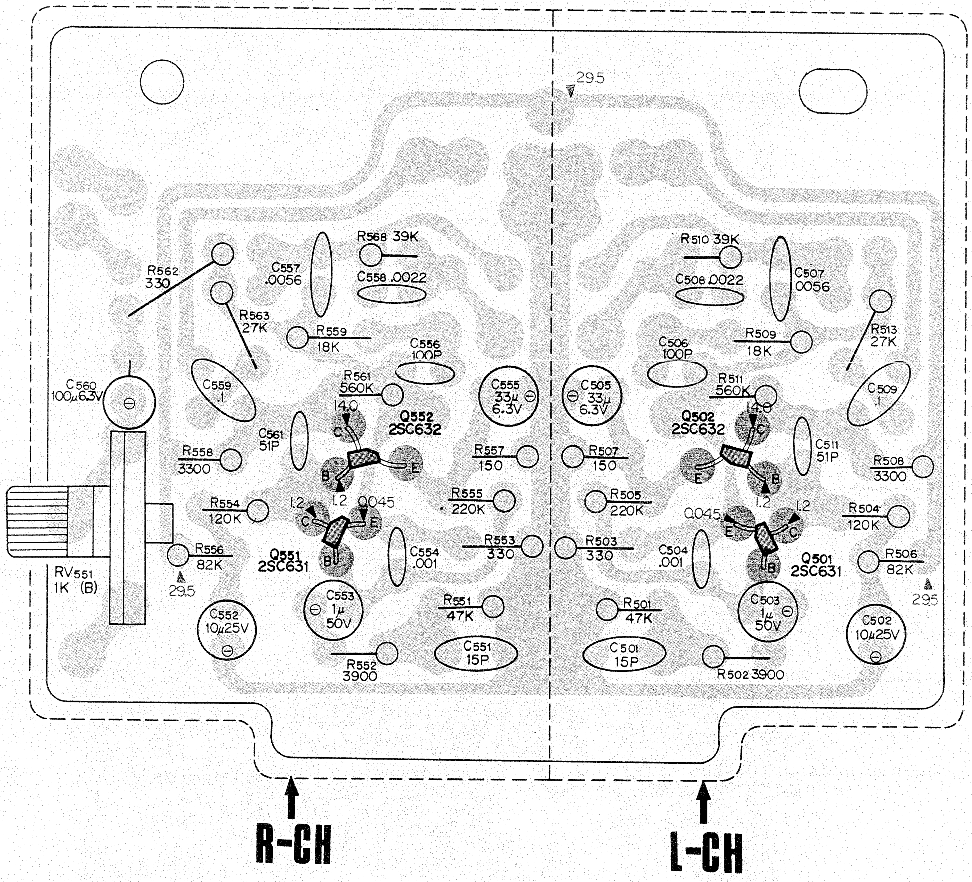
— AFC Board —

## 5-5. MOUNTING DIAGRAM – Equalizer Board –

– Conductor side –

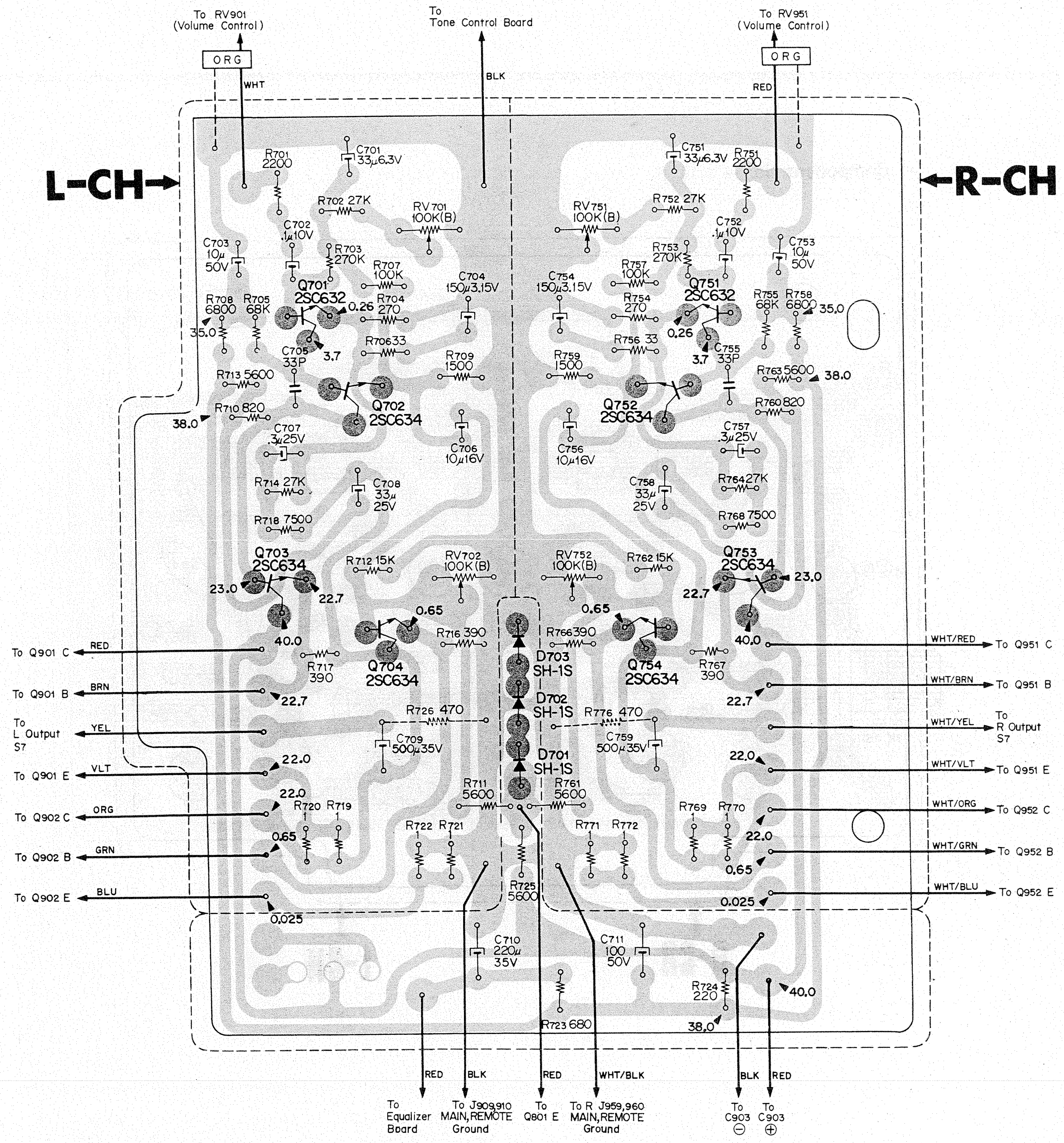

To S1-1F ④
To S1-2F ③
To S2-1
To S1-1F ⑥
To Tone Control Board R602
To Power Amp Board C710 ⊕
To Tone Control Board R652
To S1-1R ⑫
To S2-4
To S1-1R ⑩
VLT
GRN
GRN
GRN
GRN
VLT
BLU
VLT
WHT
WHT
WHT
RED
RED
RED
RED
WHT/BLU
29.5
R510 39K
C507 .0056
C508 .0022
R513 27K
R509 18K
C506 100P
C505 33μ6.3V
C509 .1
R511 560K
14.0
Q502 2SC632
R853
C853
B R N
WHT
To Cartridg Selector Board (S2)
R508 3300
C511 51P
R507 150
1.2
R505 220K
R504 120K
1.2
0.045
R503 330
R506 82K
Q501 2SC631
C504 .001
29.5
C503 1μ50V
C502 10μ25V
R501 47K
R502 3900
C501 15P
R560 39K
C558 .0022
C557 .0056
R562 330
R559 18K
R563 27K
C555 33μ6.3V
C556 100P
R561 560K
C559 .1
C560 100μ6.3V
14.0
Q552 2SC632
R557 150
C561 51P
R558 3300
R854
C854
RED
B R N
To Cartridge Selector Board(S2)
R555 220K
0.045
1.2
R554 120K
RV551 1K(B)
R553 330
C554 .001
Q551 2SC631
R556 82K
29.5
R551 47K
C553 1μ50V
C552 10μ25V
WHT/VLT
To S1-2F ④
C551 15P
R552 3900
WHT
RED
RED
RED
←L-CH
R-CH→
To L Input S1-3F ⑥
To R Input S1-3R ⑫

— Component side —

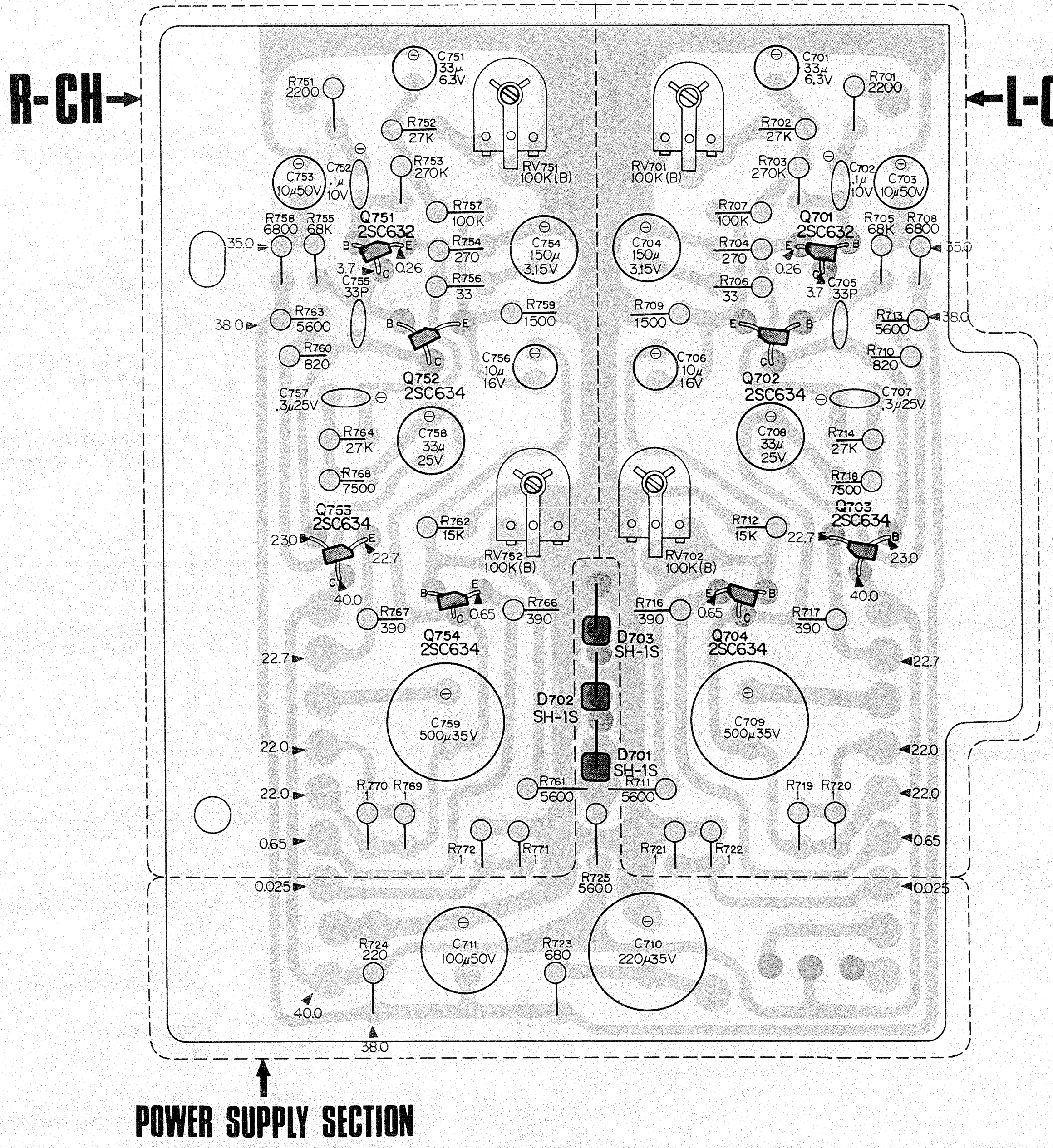

29.5
R568 39K
R562
330
C557
.0056
C558 .0022
R563
27K
R559
18K
C556
100P
C560
100μ6.3V
C559
.1
R561
560K
14.0
Q552
2SC632
C555
33μ
6.3V
C561
51P
R558
3300
C
B
E
R557
150
R554
120K
1.2
1.2
.0045
R555
220K
C
E
B
R556
82K
Q551
2SC631
C554
.001
R553
330
RV551
1K (B)
29.5
C553
1μ
50V
R551
47K
C552
10μ25V
R552
3900
C551
15P
R510 39K
C508 .0022
C507
.0056
R513
27K
C506
100P
R509
18K
C505
33μ
6.3V
R511
560K
14.0
Q502
2SC632
C509
.1
C511
51P
R507
150
E
C
B
R508
3300
R505
220K
1.2
1.2
.0045
R504
120K
E
C
B
R503
330
C504
.001
Q501
2SC631
R506
82K
29.5
R501
47K
C503
1μ
50V
C502
10μ25V
C501
15P
R502 3900
R-CH
L-CH

## 5-6. MOUNTING DIAGRAM – Power-Amplifier Board –

– Conductor side –

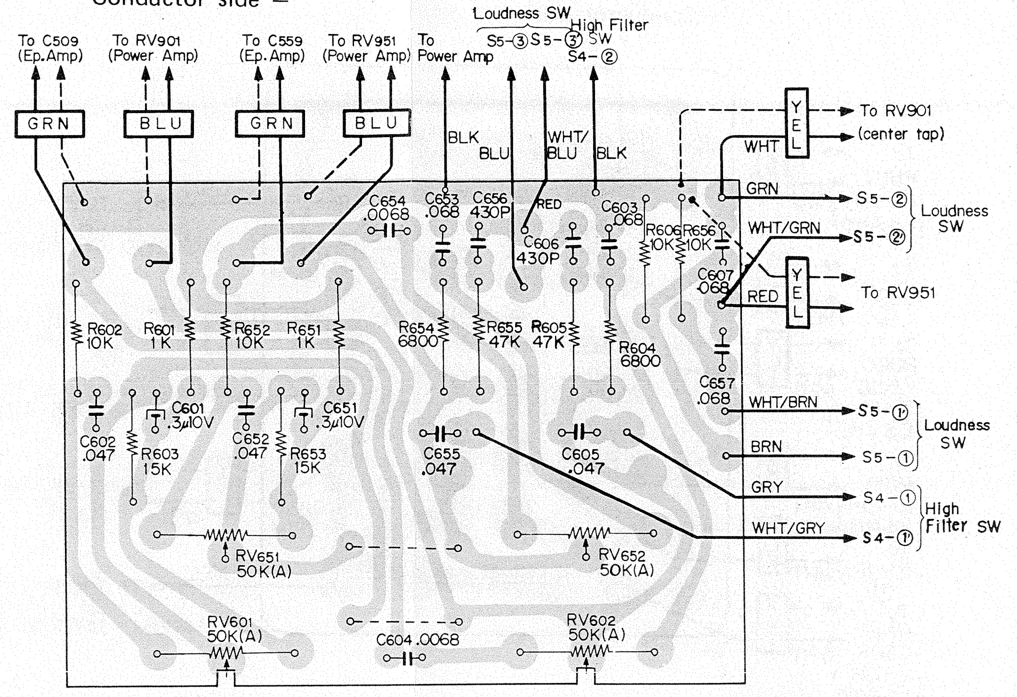

To RV901 (Volume Control)
ORG
WHT
To Tone Control Board
BLK
To RV951 (Volume Control)
ORG
RED
L-CH
R-CH
R701 2200
C701 33μ6.3V
R702 27K
RV701 100K(B)
C702 .1μ10V
C703 10μ 50V
R703 270K
R707 100K
C704 150μ3.15V
Q701 2SC632
R708 6800
R705 68K
0.26
R704 270
35.0
C705 33P
3.7
R706 33
R709 1500
R713 5600
Q702 2SC634
R710 820
38.0
C707 .3μ25V
C706 10μ16V
R714 27K
C708 33μ 25V
R718 7500
Q703 2SC634
R712 15K
RV702 100K(B)
23.0
22.7
0.65
R716 390
40.0
R717 390
Q704 2SC634
22.7
R726 470
C709 500μ35V
22.0
22.0
R720
R719
0.65
R711 5600
R722
R721
0.025
R725 5600
C710 220μ 35V
C711 100 50V
R723 680
R724 220
38.0
40.0
D703 SH-1S
D702 SH-1S
D701 SH-1S
C751 33μ6.3V
R751 2200
R752 27K
RV751 100K(B)
C752 .1μ10V
C753 10μ 50V
R753 270K
R757 100K
C754 150μ3.15V
Q751 2SC632
R755 68K
R758 6800
35.0
R754 270
0.26
R756 33
C755 33P
3.7
R759 1500
R763 5600
38.0
Q752 2SC634
R760 820
C757 .3μ25V
C756 10μ16V
C758 33μ 25V
R764 27K
R768 7500
RV752 100K(B)
R762 15K
Q753 2SC634
23.0
22.7
0.65
R766 390
40.0
Q754 2SC634
R767 390
22.7
R776 470
C759 500μ35V
22.0
R761 5600
R769
R770
R771
R772
22.0
0.65
0.025
To Q901 C
RED
To Q901 B
BRN
To L Output S7
YEL
To Q901 E
VLT
To Q902 C
ORG
To Q902 B
GRN
To Q902 E
BLU
WHT/RED
To Q951 C
WHT/BRN
To Q951 B
WHT/YEL
To R Output S7
WHT/VLT
To Q951 E
WHT/ORG
To Q952 C
WHT/GRN
To Q952 B
WHT/BLU
To Q952 E
RED
BLK
RED
WHT/BLK
BLK
RED
To Equalizer Board
To J909,910 MAIN,REMOTE Ground
To Q801 E
To R J959,960 MAIN,REMOTE Ground
To C903 ⊖
To C903 ⊕

– Component side –

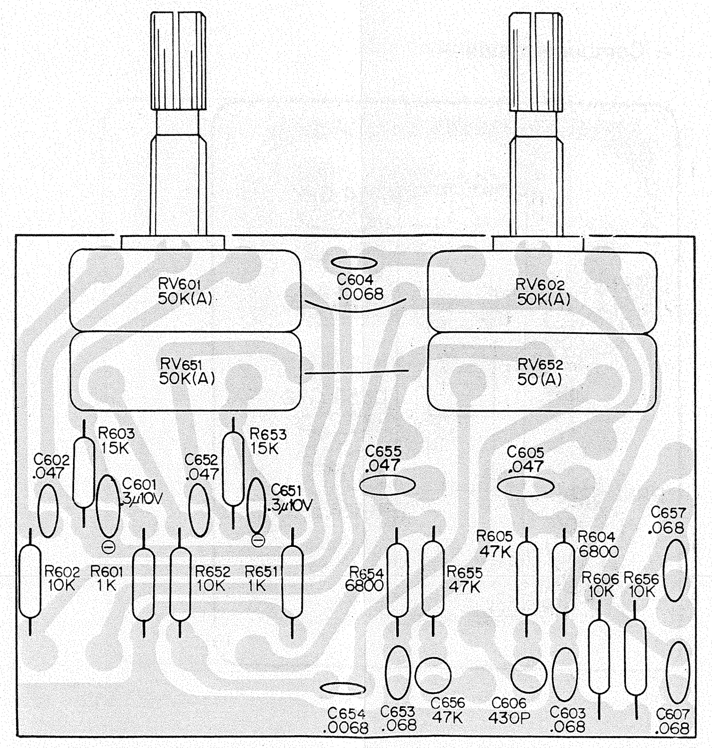

R-CH
L-CH
POWER SUPPLY SECTION
Q751 2SC632
Q752 2SC634
Q753 2SC634
Q754 2SC634
Q701 2SC632
Q702 2SC634
Q703 2SC634
Q704 2SC634
D701 SH-1S
D702 SH-1S
D703 SH-1S
RV751 100K(B)
RV752 100K(B)
RV701 100K(B)
RV702 100K(B)
C759 500μ35V
C709 500μ35V
C711 100μ50V
C710 220μ35V
R724 220
R723 680
R725 5600
35.0
38.0
23.0
40.0
22.7
22.0
0.65
0.025
38.0

## 5-7. MOUNTING DIAGRAM – Tone Control Board –

– Conductor side –

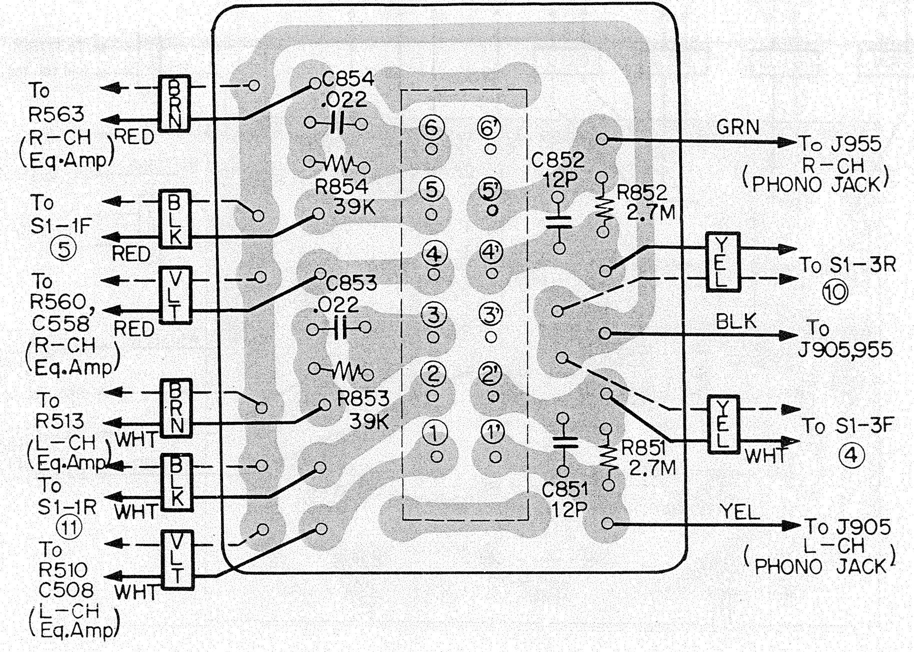

To C509 (Ep.Amp)
To RV901 (Power Amp)
To C559 (Ep.Amp)
To RV951 (Power Amp)
To Power Amp
Loudness SW
High Filter SW
S5-③
S5-③
S4-②
GRN
BLU
GRN
BLU
BLK
BLU
WHT/BLU
BLK
YEL
WHT
To RV901 (center tap)
GRN
S5-②
WHT/GRN
S5-②
Loudness SW
RED
To RV951
WHT/BRN
S5-①
BRN
S5-①
Loudness SW
GRY
S4-①
WHT/GRY
S4-①
High Filter SW
RV651 50K(A)
RV652 50K(A)
RV601 50K(A)
RV602 50K(A)
C604 .0068

– Component side –

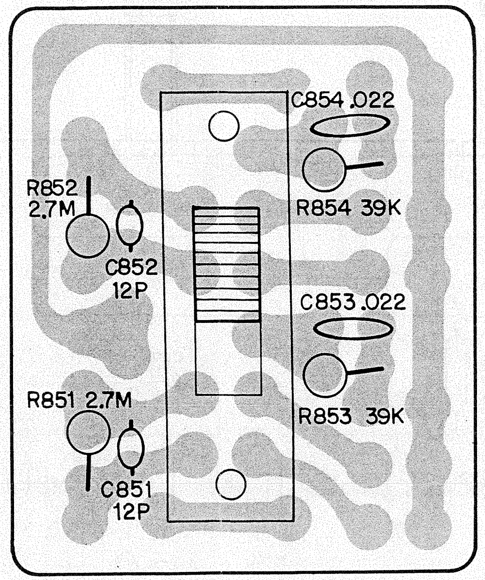

RV601 50K(A)
C604 .0068
RV602 50K(A)
RV651 50K(A)
RV652 50(A)
R603 15K
R653 15K
C602 .047
C601 3μ10V
C652 .047
C651 .3μ10V
C655 .047
C605 .047
C657 .068
R602 10K
R601 1K
R652 10K
R651 1K
R654 6800
R655 47K
R605 47K
R604 6800
R606 10K
R656 10K
C654 .0068
C653 .068
C656 47K
C606 430P
C603 .068
C607 .068

## 5-8. MOUNTING DIAGRAM – Cartridge Selector –

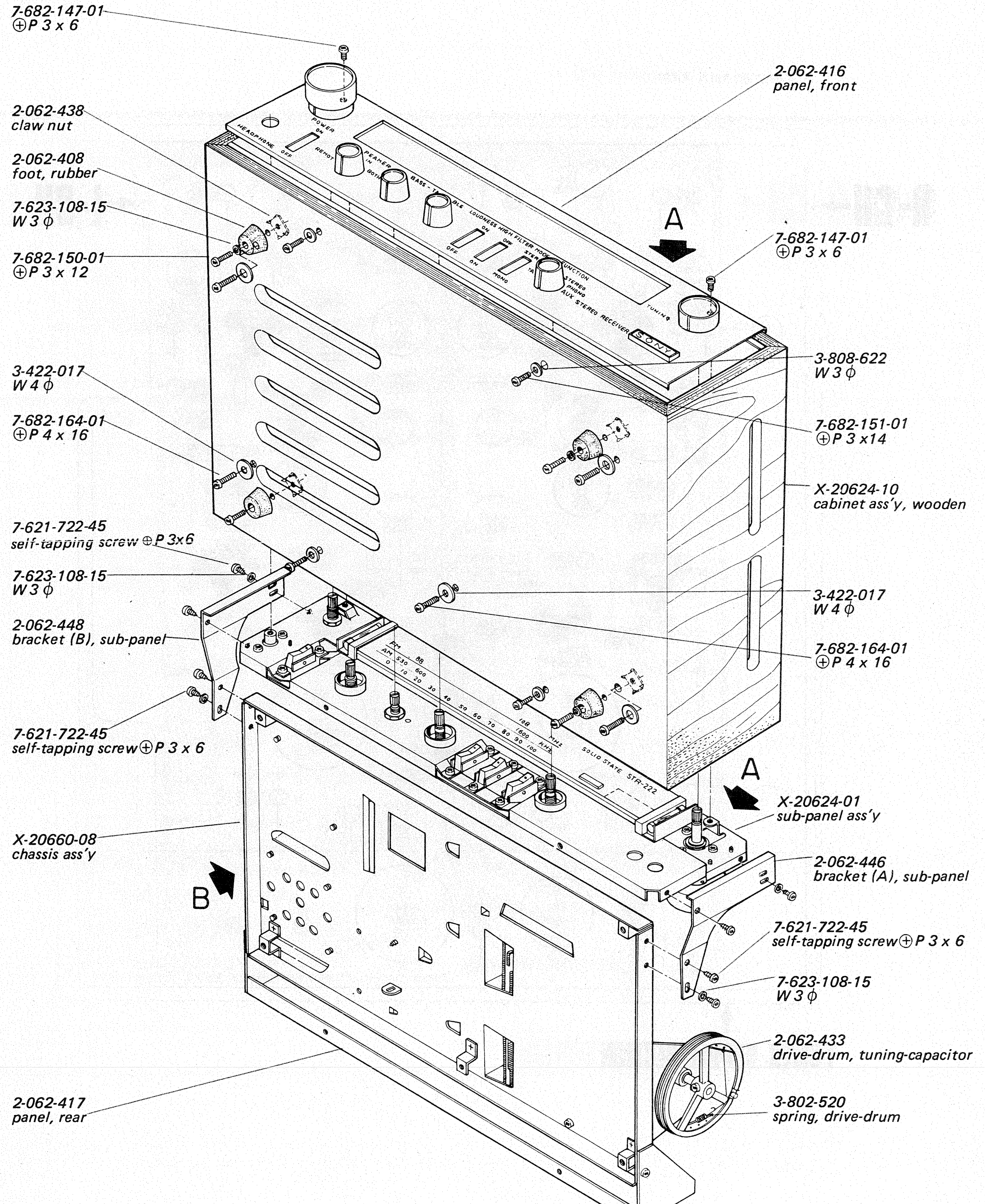
– Conductor side –

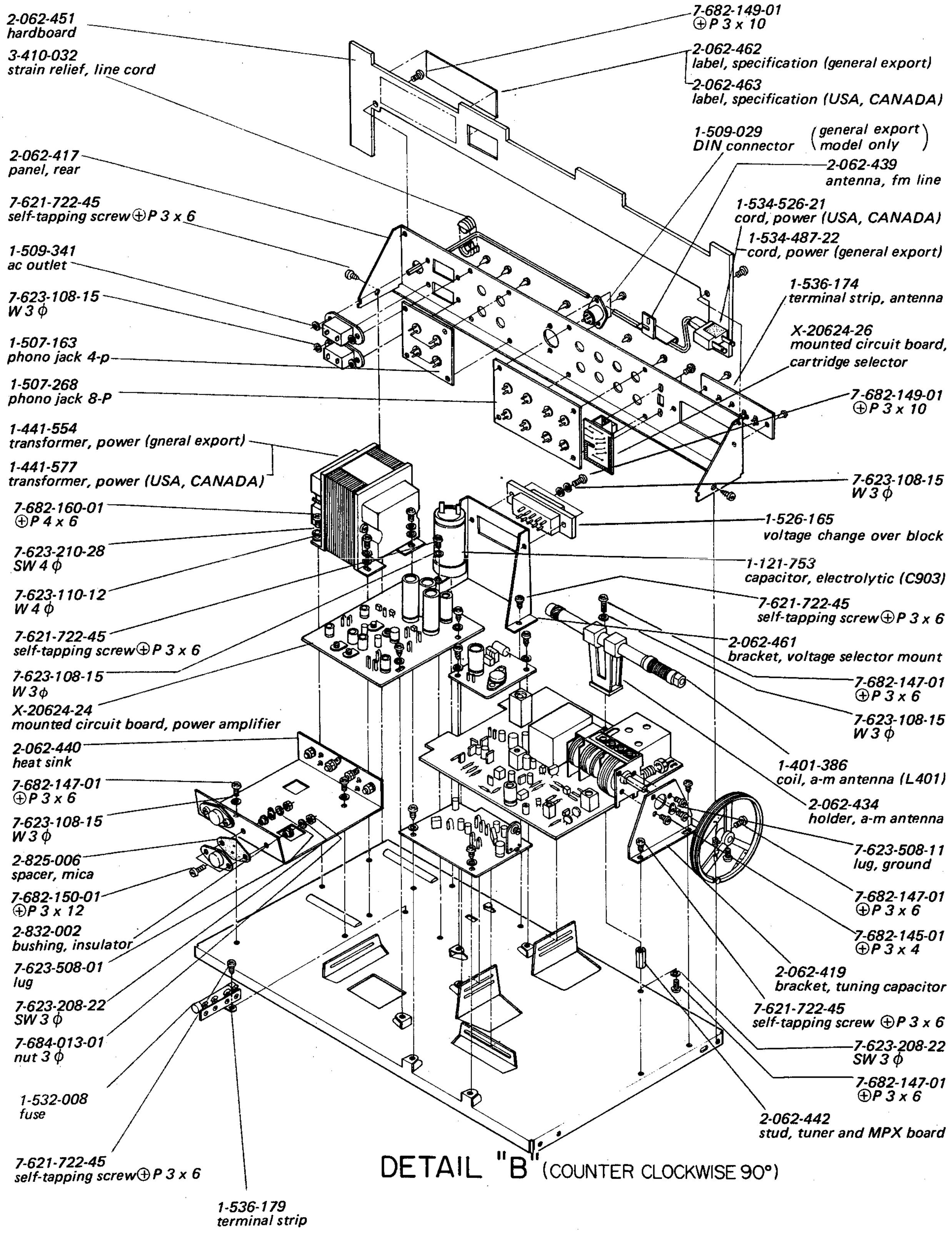

To R563 (R–CH Eq·Amp)
RED
BRN
To S1–1F ⑤
RED
BLK
To R560, C558 (R–CH Eq.Amp)
RED
VLT
To R513 (L–CH Eq.Amp)
WHT
BRN
To S1–1R ⑪
WHT
BLK
To R510 C508 (L–CH Eq.Amp)
WHT
VLT
C854 .022
R854 39K
C853 .022
R853 39K
⑥ ⑥'
⑤ ⑤'
④ ④'
③ ③'
② ②'
① ①'
C852 12P
R852 2.7M
C851 12P
R851 2.7M
GRN
To J955 R–CH (PHONO JACK)
YEL
To S1–3R ⑩
BLK
To J905,955
YEL
To S1–3F ④
WHT
YEL
To J905 L–CH (PHONO JACK)

– Component side –

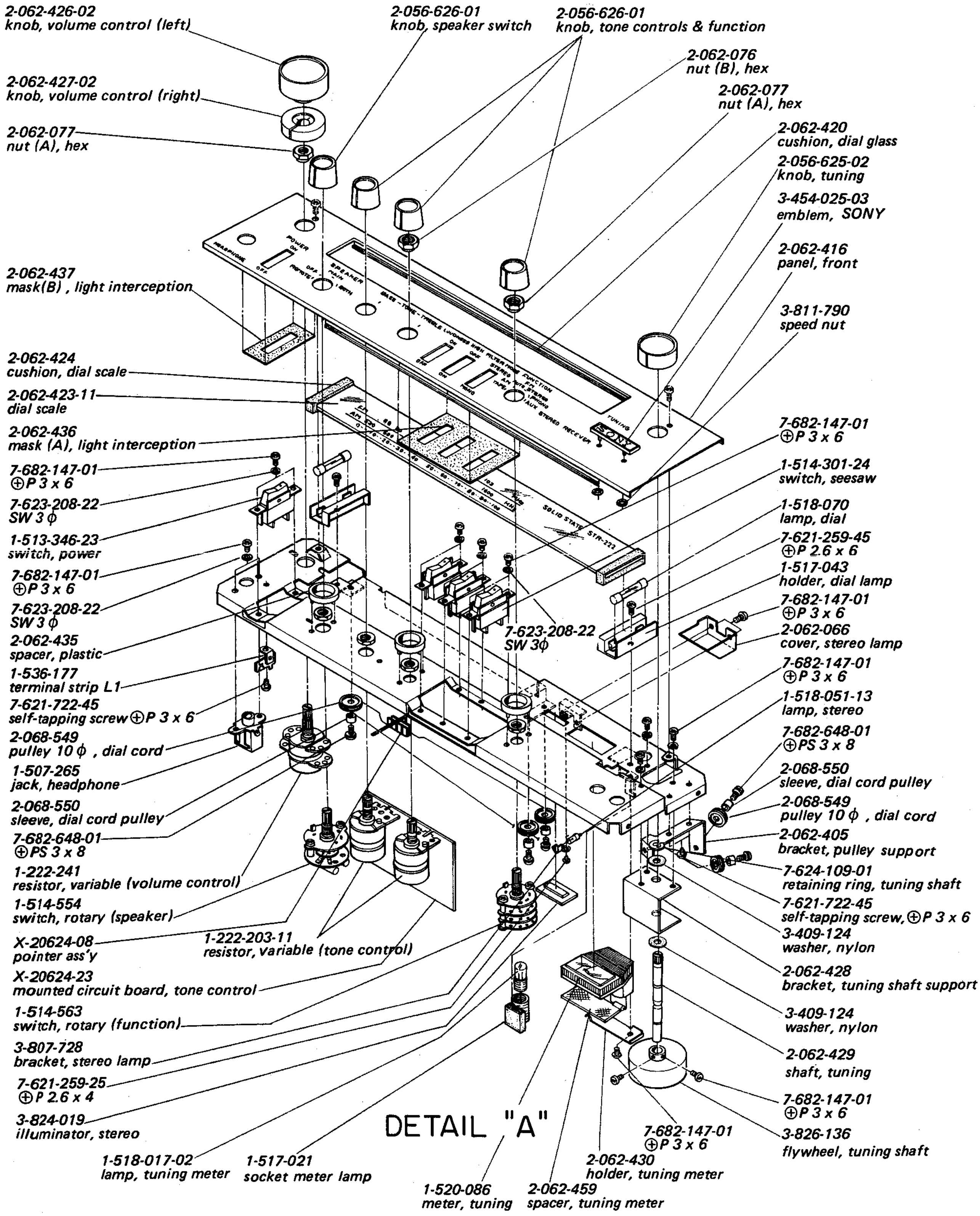

C854 .022
R854 39K
R852 2.7M
C852 12P
C853 .022
R853 39K
R851 2.7M
C851 12P

## SECTION 6
## EXPLODED VIEW


7-682-147-01 ⊕P 3 x 6
2-062-416 panel, front
2-062-438 claw nut
2-062-408 foot, rubber
7-623-108-15 W 3 φ
7-682-150-01 ⊕P 3 x 12
A
7-682-147-01 ⊕P 3 x 6
3-808-622 W 3 φ
3-422-017 W 4 φ
7-682-151-01 ⊕P 3 x14
7-682-164-01 ⊕P 4 x 16
X-20624-10 cabinet ass'y, wooden
7-621-722-45 self-tapping screw ⊕P 3x6
7-623-108-15 W 3 φ
3-422-017 W 4 φ
2-062-448 bracket (B), sub-panel
7-682-164-01 ⊕P 4 x 16
7-621-722-45 self-tapping screw⊕P 3 x 6
A
X-20624-01 sub-panel ass'y
X-20660-08 chassis ass'y
B
2-062-446 bracket (A), sub-panel
7-621-722-45 self-tapping screw⊕P 3 x 6
7-623-108-15 W 3 φ
2-062-433 drive-drum, tuning-capacitor
2-062-417 panel, rear
3-802-520 spring, drive-drum
SOLID STATE STR-222
SONY


2-062-451
hardboard
3-410-032
strain relief, line cord
2-062-417
panel, rear
7-621-722-45
self-tapping screw⊕P 3 x 6
1-509-341
ac outlet
7-623-108-15
W 3 φ
1-507-163
phono jack 4-p
1-507-268
phono jack 8-P
1-441-554
transformer, power (gneral export)
1-441-577
transformer, power (USA, CANADA)
7-682-160-01
⊕P 4 x 6
7-623-210-28
SW 4 φ
7-623-110-12
W 4 φ
7-621-722-45
self-tapping screw⊕P 3 x 6
7-623-108-15
W 3φ
X-20624-24
mounted circuit board, power amplifier
2-062-440
heat sink
7-682-147-01
⊕P 3 x 6
7-623-108-15
W 3 φ
2-825-006
spacer, mica
7-682-150-01
⊕P 3 x 12
2-832-002
bushing, insulator
7-623-508-01
lug
7-623-208-22
SW 3 φ
7-684-013-01
nut 3 φ
1-532-008
fuse
7-621-722-45
self-tapping screw⊕P 3 x 6
1-536-179
terminal strip
7-682-149-01
⊕P 3 x 10
2-062-462
label, specification (general export)
2-062-463
label, specification (USA, CANADA)
1-509-029
DIN connector
(general export model only)
2-062-439
antenna, fm line
1-534-526-21
cord, power (USA, CANADA)
1-534-487-22
cord, power (general export)
1-536-174
terminal strip, antenna
X-20624-26
mounted circuit board, cartridge selector
7-682-149-01
⊕P 3 x 10
7-623-108-15
W 3 φ
1-526-165
voltage change over block
1-121-753
capacitor, electrolytic (C903)
7-621-722-45
self-tapping screw⊕P 3 x 6
2-062-461
bracket, voltage selector mount
7-682-147-01
⊕P 3 x 6
7-623-108-15
W 3 φ
1-401-386
coil, a-m antenna (L401)
2-062-434
holder, a-m antenna
7-623-508-11
lug, ground
7-682-147-01
⊕P 3 x 6
7-682-145-01
⊕P 3 x 4
2-062-419
bracket, tuning capacitor
7-621-722-45
self-tapping screw ⊕P 3 x 6
7-623-208-22
SW 3 φ
7-682-147-01
⊕P 3 x 6
2-062-442
stud, tuner and MPX board

DETAIL "B" (COUNTER CLOCKWISE 90°)


2-062-426-02 knob, volume control (left)
2-062-427-02 knob, volume control (right)
2-062-077 nut (A), hex
2-056-626-01 knob, speaker switch
2-056-626-01 knob, tone controls & function
2-062-076 nut (B), hex
2-062-077 nut (A), hex
2-062-420 cushion, dial glass
2-056-625-02 knob, tuning
3-454-025-03 emblem, SONY
2-062-416 panel, front
3-811-790 speed nut
2-062-437 mask(B), light interception
2-062-424 cushion, dial scale
2-062-423-11 dial scale
2-062-436 mask (A), light interception
7-682-147-01 ⊕P 3 x 6
7-623-208-22 SW 3 ϕ
1-513-346-23 switch, power
7-682-147-01 ⊕P 3 x 6
7-623-208-22 SW 3 ϕ
2-062-435 spacer, plastic
1-536-177 terminal strip L1
7-621-722-45 self-tapping screw ⊕P 3 x 6
2-068-549 pulley 10 ϕ, dial cord
1-507-265 jack, headphone
2-068-550 sleeve, dial cord pulley
7-682-648-01 ⊕PS 3 x 8
1-222-241 resistor, variable (volume control)
1-514-554 switch, rotary (speaker)
X-20624-08 pointer ass'y
1-222-203-11 resistor, variable (tone control)
X-20624-23 mounted circuit board, tone control
1-514-563 switch, rotary (function)
3-807-728 bracket, stereo lamp
7-621-259-25 ⊕P 2.6 x 4
3-824-019 illuminator, stereo
1-518-017-02 lamp, tuning meter
1-517-021 socket meter lamp
DETAIL "A"
1-520-086 meter, tuning
2-062-459 spacer, tuning meter
2-062-430 holder, tuning meter
7-682-147-01 ⊕P 3 x 6
7-623-208-22 SW 3ϕ
7-682-147-01 ⊕P 3 x 6
1-514-301-24 switch, seesaw
1-518-070 lamp, dial
7-621-259-45 ⊕P 2.6 x 6
1-517-043 holder, dial lamp
7-682-147-01 ⊕P 3 x 6
2-062-066 cover, stereo lamp
7-682-147-01 ⊕P 3 x 6
1-518-051-13 lamp, stereo
7-682-648-01 ⊕PS 3 x 8
2-068-550 sleeve, dial cord pulley
2-068-549 pulley 10 ϕ, dial cord
2-062-405 bracket, pulley support
7-624-109-01 retaining ring, tuning shaft
7-621-722-45 self-tapping screw, ⊕P 3 x 6
3-409-124 washer, nylon
2-062-428 bracket, tuning shaft support
3-409-124 washer, nylon
2-062-429 shaft, tuning
7-682-147-01 ⊕P 3 x 6
3-826-136 flywheel, tuning shaft
SONY

## SECTION 7

## ELECTRICAL PARTS LIST

### Mounted Circuit Boards

| Ref. No. | Part No. | Description |
|---|---|---|
| | X-20624-22 | Equalizer Amplifier Circuit Board |
| | X-20624-23 | Tone Control Circuit Board |
| | X-20624-24 | Power Amplifier Circuit Board |
| | X-20624-25 | Power Supply Circuit Board |
| | X-20624-26 | Cartridge Selector Circuit Board |
| | X-20624-27 | Tuner Circuit Board |
| | X-20701-27 | AFC Circuit Board |

### Semiconductors

| Ref. No. | Part No. | Description | |
|---|---|---|---|
| D101 | | Diode | 1T243 |
| D102 | | " | 1S351 |
| D201 | | " | 1T22AJ |
| D202 | | " | 1T22AJ |
| D203 | | " | 1T23A |
| D204 | | " | 1T23A |
| D301 | | " | 1T23A |
| D302 | | " | 1T23A |
| D303 | | " | 1T22AJ |
| D304 | | " | 1T22AJ |
| D305 | | " | 1T22AJ |
| D306 | | " | 1T22AJ |
| D401 | | " | 1T23A |
| D402 | | " | 1T23A |
| D403 | | " | 1T23A |
| D701 | | " | SH-1S |
| D702 | | " | SH-1S |
| D703 | | " | SH-1S |
| D801 | | " | CD-2 |
| Q101 | | FET | 2SK23 |
| Q102 | | Transistor | 2SC710 |
| Q103 | | " | 2SC710 |
| Q201 | | " | 2SC403A |
| Q202 | | " | 2SC403A |
| Q203 | | " | 2SC403A |
| Q204 | | " | 2SC403A |
| Q301 | | " | 2SC633 |
| Q302 | | " | 2SC633 |
| Q303 | | " | 2SC633 |
| Q401 | | " | 2SC403A |
| Q402 | | " | 2SC403A |
| Q403 | | " | 2SC403A |
| Q404 | | " | 2SC403A |
| Q501 (Q551) | | " | 2SC631 |
| Q502 (Q552) | | " | 2SC632 |
| Q701 (Q751) | | " | 2SC632 |
| Q702 (Q752) | | " | 2SC634 |
| Q703 (Q753) | | Transistor | 2SC634 |
| Q704 (Q754) | | " | 2SC634 |
| Q801 | | " | 2SC633 |
| Q802 | | " | 2SD28 |
| Q901 (Q951) | | " | 2SD28 |
| Q902 (Q952) | | " | 2SD28 |

### Transformers and Coils

| Ref. No. | Part No. | Description |
|---|---|---|
| B101 | 1-417-025-12 | Transformer, antenna matching |
| IFT101 | 1-403-556-21 | IFT, 10.7 MHz |
| IFT201 | 1-403-291 | " 10.7 MHz |
| IFT401 | 1-403-152 | " 455 kHz |
| IFT402 | 1-403-128 | " 455 kHz |
| L101 | 1-401-391 | Coil, fm antenna |
| L102 | 1-425-547 | " fm rf |
| L103 | 1-405-393 | " fm OSC |
| L301 | 1-425-260-12 | Transformer, switching 38 kHz |
| L302 | 1-409-181 | Coil, SCA channel trap |
| L401 | 1-401-386-12 | " a-m antenna |
| L402 | 1-405-391 | " a-m OSC |
| MU301 | 1-425-548 | MPX Unit |
| T901 | 1-441-554-12 | Transformer, power (General Export Model) |
| | 1-441-577-12 | Transformer, power (USA, CANADA Model) |

### Capacitors

All capacitance values are in $\mu$F except as indicated with p, which means $\mu\mu$F.

| Ref. No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| C101 | 1-101-861 | 15p | ±5% | 50V, | ceramic |
| C102 | 1-101-861 | 15p | ±5% | 50V, | " |
| C103 | 1-102-077 | 0.01 | ±20% | 50V, | " |
| C104 | 1-101-918 | 0.001 | $^{+80}_{-20}$% | 25V, | " |
| C105 | 1-101-872 | 33p | ±5% | 50V, | " |
| C106 | 1-101-385 | 180p | ±10% | 50V, | " |
| C107 | 1-102-077 | 0.01 | ±20% | 50V, | " |
| C108 | 1-102-875 | 7p | ±5% | 50V, | " |
| C109 | 1-102-894 | 15p | ±5% | 50V, | " |
| C110 | 1-101-073 | 0.02 | $^{+80}_{-20}$% | 25V, | " |
| C111 | 1-102-077 | 0.01 | ±20% | 50V, | " |
| C112 | 1-101-073 | 0.02 | $^{+80}_{-20}$% | 25V, | " |
| C113 | 1-101-073 | 0.02 | $^{+80}_{-20}$% | 25V, | " |
| C114 | 1-101-073 | 0.02 | $^{+80}_{-20}$% | 25V, | " |
| C116 | 1-102-875 | 7p | ±5% | 50V, | " |
| C117 | 1-101-073 | 0.02 | $^{+80}_{-20}$% | 25V, | " |
| C118 | 1-101-073 | 0.02 | $^{+80}_{-20}$% | 25V, | " |
| C119 | 1-105-685-12 | 0.1 | ±10% | 50V, | mylar |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| C120 | 1-121-356 | 100 $\pm^{100}_{10}$% 16V, electrolytic |
| C201 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C202 | 1-121-347 | 10 $\pm^{100}_{10}$% 16V, electrolytic |
| C203 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C204 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C205 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C206 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C207 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C208 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C209 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C210<br>C211 | Included in IFT201 | |
| C212 | 1-121-350 | 33 $\pm^{100}_{10}$% 16V, electrolytic |
| C213 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C214 | 1-101-030 | 200p ±5% 50V, 〃 |
| C215 | 1-102-816 | 120p ±5% 50V, 〃 |
| C216 | 1-102-816 | 120p ±5% 50V, 〃 |
| C217 | 1-121-284 | 33 $\pm^{100}_{10}$% 6.3V, electrolytic |
| C218 | 1-101-882 | 51p ±5% 50V, ceramic |
| C219 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C220 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C221 | 1-101-030 | 200p ±5% 50V, 〃 |
| C301 | 1-121-347 | 10 $\pm^{100}_{10}$% 16V, electrolytic |
| C302 | 1-121-356 | 100 $\pm^{100}_{10}$% 16V, 〃 |
| C303<br>C304 | Included in MU301 | |
| C306 | 1-101-030 | 200 p ±5% 50V, ceramic |
| C307 | 1-121-356 | 100 $\pm^{100}_{10}$% 16V, electrolytic |
| C308 | 1-127-021 | 0.3 ±20% 10V, electrolytic (aluminum) |
| C309 | 1-101-030 | 200p ±5% 50V, ceramic |
| C310 | 1-105-683-12 | 0.068 ±10% 50V, mylar |
| C311 | 1-121-347 | 10 $\pm^{100}_{10}$% 16V, electrolytic |
| C312 | 1-103-575 | 4700p ±5% 50V, styrol |
| C313 | 1-127-022 | 0.5 ±20% 10V, electrolytic (aluminum) |
| C314 | 1-105-679-12 | 0.033 ±10% 50V, mylar |
| C315 | 1-105-679-12 | 0.033 ±10% 50V, 〃 |
| C316 | 1-105-665-12 | 0.0022 ±10% 50V, 〃 |
| C317 | 1-105-665-12 | 0.0022 ±10% 50V, 〃 |
| C318 | 1-105-665-12 | 0.0022 ±10% 50V, 〃 |
| C319 | 1-105-665-12 | 0.0022 ±10% 50V, 〃 |
| C320 | 1-105-663-12 | 0.0015 ±10% 50V, 〃 |
| C321 | 1-105-663-12 | 0.0015 ±10% 50V, 〃 |
| C322 | 1-105-667-12 | 0.0033 ±10% 50V, 〃 (General Export Model) |
| | 1-105-671-12 | 0.0068 ±10% 50V, mylar (USA, CANADA Model) |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| C323 | 1-105-667-12 | 0.0033 ±10% 50V, mylar (General Export Model) |
| | 1-105-671-12 | 0.0068 ±10% 50V, mylar (USA, CANADA Model) |
| C324 | 1-127-021 | 0.3 ±20% 10V, electrolytic (aluminum) |
| C325 | 1-127-021 | 0.3 ±20% 10V, electrolytic |
| C326 | 1-107-140 | 240p ±10% 50V, silvered mica |
| C401 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C402 | 1-105-681-12 | 0.047 ±10% 50V, mylar |
| C403 | Included in IFT401 | |
| C404 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C405 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C406 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C407 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C408 | 1-103-608 | 200p ±5% 50V, styrol |
| C409 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C410 | 1-105-677 | 0.022 ±10% 50V, mylar |
| C411 | Included in IFT402 | |
| C412 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C413 | 1-101-884 | 56p ±5% 50V, 〃 |
| C414 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C415 | 1-105-667-12 | 0.0033 ±10% 50V, mylar |
| C416 | 1-105-677-12 | 0.022 ±10% 50V, 〃 |
| C417 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C418 | 1-105-669-12 | 0.0047 ±10% 50V, mylar |
| C419 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, ceramic |
| C420 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C421 | 1-101-073 | 0.02 $\pm^{80}_{20}$% 25V, 〃 |
| C422 | 1-121-356 | 100 $\pm^{100}_{10}$% 16V, electrolytic |
| C423 | 1-121-344 | 3.3 $\pm^{150}_{10}$% 25V, 〃 |
| C424 | 1-121-344 | 3.3 $\pm^{150}_{10}$% 25V, 〃 |
| C425 | 1-121-290 | 100 $\pm^{100}_{10}$% 3.15V, 〃 |
| C426 | 1-121-281 | 4.7 $\pm^{100}_{10}$% 25V, 〃 |
| C501(C551) | 1-101-899 | 15p ±10% 50V, ceramic |
| C502(C552) | 1-121-283 | 10 $\pm^{100}_{10}$% 25V, electrolytic |
| C503(C553) | 1-121-343 | 1 $\pm^{150}_{10}$% 50V, 〃 |
| C504(C554) | 1-105-661-12 | 0.001 ±10% 50V, mylar |
| C505(C555) | 1-121-401 | 33 $\pm^{100}_{10}$% 6.3V, electrolytic |
| C506(C556) | 1-101-896 | 100p ±5% 50V, ceramic |
| C507(C557) | 1-105-670-12 | 0.0056 ±10% 50V, mylar |
| C508(C558) | 1-105-665-12 | 0.0022 ±10% 50V, 〃 |
| C509(C559) | 1-105-845-12 | 0.1 ±10% 50V, 〃 |
| C511(C561) | 1-101-883 | 51p ±10% 50V, ceramic |
| C560 | 1-121-291 | 100 $\pm^{100}_{10}$% 6.3V, electrolytic |
| C601(C651) | 1-127-021 | 0.3 ±20% 10V, electrolytic (aluminum) |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| C602(C652) | 1-105-681-12 | 0.047 ±10% 50V, mylar |
| C603(C653) | 1-105-683-12 | 0.068 ±10% 50V, 〃 |
| C604(C654) | 1-105-671-12 | 0.0068 ±10% 50V, 〃 |
| C605(C655) | 1-105-681-12 | 0.047 ±10% 50V, 〃 |
| C606(C656) | 1-102-835 | 430p ±10% 50V, ceramic |
| C607(C657) | 1-105-683-12 | 0.068 ±10% 50V, mylar |
| C701(C751) | 1-121-401 | 33 $\pm^{100}_{10}\%$ 6.3V, electrolytic |
| C702(C752) | 1-127-019 | 0.1 ±20% 10V, electrolytic (aluminum) |
| C703(C753) | 1-121-348 | 10 $\pm^{100}_{10}\%$ 50V, electrolytic |
| C704(C754) | 1-121-741 | 150 ±20% 3.15V, 〃 |
| C705(C755) | 1-101-873 | 33p ±10% 50V, ceramic |
| C706(C756) | 1-121-347 | 10 $\pm^{100}_{10}\%$ 16V, electrolytic |
| C707(C757) | 1-127-092 | 0.3 ±20% 25V, electrolytic (aluminum) |
| C708(C758) | 1-121-286 | 33 $\pm^{100}_{10}\%$ 25V, electrolytic |
| C709(C759) | 1-121-361 | 500 $\pm^{100}_{10}\%$ 35V, 〃 |
| C710 | 1-121-385 | 220 $\pm^{100}_{10}\%$ 50V, 〃 |
| C711 | 1-121-384 | 100 $\pm^{100}_{10}\%$ 50V, 〃 |
| C801 | 1-121-358 | 220 $\pm^{100}_{10}\%$ 16V, 〃 |
| C802 | 1-105-719-12 | 0.033 ±10% 100V, mylar |
| C803 | 1-105-719-12 | 0.033 ±10% 100V, 〃 |
| C851 | 1-101-961 | 12p ±5% 50V, ceramic |
| C852 | 1-101-961 | 12p ±5% 50V, 〃 |
| C853 | 1-105-677-12 | 0.022 ±10% 50V, mylar |
| C854 | 1-105-677-12 | 0.022 ±10% 50V, 〃 |
| C903 | 1-121-753 | 1000 $\pm^{100}_{10}\%$ 50V, electrolytic |
| C904 | 1-115-071 | 0.0047 600V, oil |
| CT101<br>CT102<br>CT401<br>CT402<br>CV101<br>CV102<br>CV103<br>CV401<br>CV402<br>CV403 | 1-151-197 | tuning capacitor |
| CT103 | 1-141-087 | trimmer capacitor 2p～10p |

**Resistors**

All resistance values are in ohms, ±5%, ¼W and carbon type unless otherwise indicated.

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| R101 | 1-244-657 | 220 |
| R102 | 1-244-701 | 15 k |
| R103 | 1-244-691 | 5.6 k |
| R104 | 1-244-673 | 1 k |
| R105 | 1-244-649 | 100 |
| R106 | 1-244-697 | 10 k |
| R107 | 1-244-693 | 6.8 k |
| R108 | 1-244-677 | 1.5 k |
| R109 | 1-244-673 | 1 k |
| R110 | 1-244-643 | 56 |
| R111 | 1-244-643 | 56 |
| R112 | 1-244-643 | 56 |
| R113 | 1-244-677 | 1.5 k |
| R114 | 1-244-721 | 100 k |
| R115 | 1-244-729 | 220 k |
| R116 | 1-244-713 | 47 k |
| R201 | 1-244-647 | 82 |
| R202 | 1-244-671 | 820 |
| R203 | 1-244-689 | 4.7 k |
| R204 | 1-244-651 | 120 |
| R205 | 1-244-681 | 2.2 k |
| R206 | 1-244-663 | 390 |
| R207 | 1-244-677 | 1.5 k |
| R208 | 1-244-679 | 1.8 k |
| R209 | 1-244-671 | 820 |
| R210 | 1-244-645 | 68 |
| R211 | 1-244-673 | 1 k |
| R212 | 1-244-671 | 820 |
| R213 | 1-244-695 | 8.2 k |
| R214 | 1-244-657 | 220 |
| R215 | 1-244-679 | 1.8 k |
| R216 | 1-244-669 | 680 |
| R217 | 1-244-671 | 820 |
| R218 | 1-244-657 | 220 |
| R219 | 1-244-675 | 1.2 k |
| R220 | 1-244-634 | 24 |
| R221 | 1-244-625 | 10 |
| R222 | 1-244-637 | 33 |
| R223 | 1-244-647 | 82 |
| R225 | 1-244-673 | 1 k |
| R226 | 1-244-673 | 1 k |
| R227 | 1-244-691 | 5.6 k |
| R228 | 1-244-691 | 5.6 k |
| R229 | 1-244-657 | 220 |
| R230 | 1-244-685 | 3.3 k |
| R231 | 1-244-673 | 1 k |
| R301 | 1-244-714 | 51 k |
| R302 | 1-244-714 | 51 k |
| R303 | 1-244-673 | 1 k |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| R304 | 1-244-697 | 10 k |
| R306 | 1-244-721 | 100 k |
| R307 | 1-244-690 | 5.1 k |
| R308 | 1-244-649 | 100 |
| R309 | 1-244-689 | 4.7 k |
| R310 | 1-244-661 | 330 |
| R311 | 1-244-715 | 56 k |
| R312 | 1-244-669 | 680 |
| R313 | 1-244-690 | 5.1 k |
| R314 | 1-211-044 | 330 1 W |
| R315 | 1-242-657 | 220 |
| R316 | 1-242-666 | 510 |
| R317 | 1-242-666 | 510 |
| R318 | 1-242-673 | 1 k |
| R319 | 1-242-673 | 1 k |
| R320 | 1-242-666 | 510 |
| R321 | 1-242-666 | 510 |
| R322 | 1-242-683 | 2.7 k |
| R323 | 1-242-683 | 2.7 k |
| R324 | 1-242-672 | 910 |
| R325 | 1-242-672 | 910 |
| R326 | 1-242-686 | 3.6 k |
| R327 | 1-242-686 | 3.6 k |
| R328 | 1-242-689 | 4.7 k |
| R329 | 1-242-689 | 4.7 k |
| R330 | 1-242-709 | 33 k |
| R331 | 1-242-709 | 33 k |
| R332 | 1-242-691 | 5.6 k |
| R333 | 1-242-697 | 10 k |
| R334 | 1-242-657 | 220 |
| R401 | 1-244-691 | 5.6 k |
| R402 | 1-244-664 | 430 |
| R403 | 1-244-697 | 10 k |
| R404 | 1-244-693 | 6.8 k |
| R405 | 1-244-707 | 27 k |
| R406 | 1-244-691 | 5.6 k |
| R407 | 1-244-673 | 1 k |
| R408 | 1-244-673 | 1 k |
| R409 | 1-244-684 | 3 k |
| R410 | 1-244-671 | 820 |
| R411 | 1-244-687 | 3.9 k |
| R412 | 1-244-689 | 4.7 k |
| R413 | 1-244-665 | 470 |
| R414 | 1-244-643 | 56 |
| R415 | 1-244-689 | 4.7 k |
| R416 | 1-244-645 | 68 |
| R417 | 1-202-565 | 470 ±10% ½W, composition |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| R419 | 1-244-689 | 4.7 k |
| R420 | 1-244-657 | 220 |
| R421 | 1-244-673 | 1 k |
| R422 | 1-244-673 | 1 k |
| R423 | 1-244-701 | 15 k |
| R424 | 1-244-719 | 82 k |
| R425 | 1-244-673 | 1 k |
| R426 | 1-244-671 | 820 |
| R427 | 1-244-657 | 220 |
| R428 | 1-244-669 | 680 |
| R429 | 1-244-643 | 56 |
| R430 | 1-244-643 | 56 |
| R431 | 1-244-689 | 4.7 k |
| R432 | 1-244-632 | 20 |
| R433 | 1-244-645 | 68 |
| R501(R551) | 1-242-713 | 47 k |
| R502(R552) | 1-242-687 | 3.9 k |
| R503(R553) | 1-242-661 | 330 |
| R504(R554) | 1-242-723 | 120 k |
| R505(R555) | 1-242-729 | 220 k |
| R506(R556) | 1-242-719 | 82 k |
| R507(R557) | 1-242-653 | 150 |
| R508(R558) | 1-242-685 | 3.3 k |
| R509(R559) | 1-242-703 | 18 k |
| R510(R560) | 1-242-711 | 39 k |
| R511(R561) | 1-242-739 | 560 k |
| R513(R563) | 1-242-707 | 27 k |
| R562 | 1-242-661 | 330 |
| R601(R651) | 1-244-673 | 1 k |
| R602(R652) | 1-244-697 | 10 k |
| R603(R653) | 1-244-701 | 15 k |
| R604(R654) | 1-244-693 | 6.8 k |
| R605(R655) | 1-244-713 | 47 k |
| R606(R656) | 1-244-697 | 10 k |
| R701(R751) | 1-242-681 | 2.2 k |
| R702(R752) | 1-242-707 | 2.7 k |
| R703(R753) | 1-242-731 | 270 k |
| R704(R754) | 1-242-659 | 270 |
| R705(R755) | 1-242-717 | 68 k |
| R706(R756) | 1-242-637 | 33 |
| R707(R757) | 1-242-721 | 100 k |
| R708(R758) | 1-242-693 | 6.8 k |
| R709(R759) | 1-242-677 | 1.5 k |
| R710(R760) | 1-242-671 | 820 |
| R711(R761) | 1-242-691 | 5.6 k |
| R712(R762) | 1-242-701 | 15 k |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| R713(R763) | 1-242-691 | 5.6 k |
| R714(R764) | 1-242-707 | 27 k |
| R716(R766) | 1-242-663 | 390 |
| R717(R767) | 1-242-663 | 390 |
| R718(R768) | 1-242-694 | 7.5 k |
| R719(R769) | 1-242-601 | 1 |
| R720(R770) | 1-242-601 | 1 |
| R721(R771) | 1-242-601 | 1 |
| R722(R772) | 1-242-601 | 1 |
| R723 | 1-242-669 | 680 |
| R724 | 1-242-657 | 220 |
| R725 | 1-242-691 | 5.6 k |
| R726(R776) | 1-202-565 | 470 ±10% ½W, composition |
| R801 | 1-206-055 | 100 ±10% 2 W, metal-oxide |
| R802 | 1-244-687 | 3.9 k |
| R803 | 1-244-697 | 10 k |
| R804 | 1-244-681 | 2.2 k |
| R851 | 1-244-949 | 2.7 M |
| R852 | 1-244-949 | 2.7 M |
| R853 | 1-244-711 | 39 k |
| R854 | 1-244-711 | 39 k |
| R901(R951) | 1-244-721 | 100 k |
| R902(R952) | 1-244-721 | 100 k |
| R903(R953) | 1-244-683 | 2.7 k |
| R904(R954) | 1-244-691 | 5.6 k |
| R905(R955) | 1-244-745 | 1 M (General Export Model only) |
| R906(R956) | 1-244-719 | 82 k |
| R908(R958) | 1-202-565 | 470 ±10% ½W, composition |
| R909(R959) | 1-207-211 | 2 ±10% 3 W, wire-wound |
| R910 | 1-202-645 | 1 M ±10% ½W, composition (USA, CANADA Model only) |

**Resistor, semi-fixed**

| | | | |
|---|---|---|---|
| Rv501 | 1-221-964 | 1 k | |
| Rv701(Rv751) | 1-221-323 | 100 k | * |
| | 1-221-410 | 100 k | |
| Rv702(Rv752) | 1-221-323 | 100 k | * |
| | 1-221-410 | 100 k | |

**Resistor, variable**

| | | |
|---|---|---|
| Rv601(Rv651) | 1-222-203 | 50 k/50 k |
| Rv602(Rv652) | 1-222-203 | 50 k/50 k |
| Rv901(Rv951) | 1-222-241 | 100 k/100 k |

* to be selected.

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|

**Switches**

| | | |
|---|---|---|
| S1 | 1-514-563 | Switch, rotary (FUNCTION) |
| S2 | 1-514-314 | 〃 slide (M·M/CERA) |
| S3 | 1-514-301-24 | 〃 seesaw (MODE) |
| S4 | 1-514-301-24 | 〃 seesaw (HIGH FILTER) |
| S5 | 1-514-301-24 | 〃 seesaw (LOUDNESS) |
| S6 | 1-513-346-23 | 〃 seesaw (POWER) |
| S7 | 1-514-555 | 〃 rotary (SPEAKER) |

**Filters**

| | | |
|---|---|---|
| CF201 | 1-403-562-92 | Filter, ceramic 10.7 MHz |
| CF202 | 1-403-562-92 | 〃 ceramic 10.7 MHz |
| CF203 | 1-403-562-92 | 〃 ceramic 10.7 MHz |
| CF204 | 1-403-562-92 | 〃 ceramic 10.7 MHz |
| CF401 | 1-403-153-14 | 〃 ceramic 455 kHz |

**Miscellaneous**

| | | |
|---|---|---|
| | 1-231-057 | Encapsulated Component, 120Ω + 0.033μF |
| | 1-507-163 | Phono Jack 4-P |
| | 1-507-265 | Jack, headphone |
| | 1-507-268 | Phono Jack, 8-P |
| | 1-509-029 | REC/P.B. Connector (General Export Model only) |
| | 1-509-341 | AC Outlet |
| | 1-517-021 | Socket, pilot lamp |
| | 1-517-043-13 | 〃 dial lamp |
| | 1-518-017-02 | Lamp, pilot |
| | 1-518-051-13 | 〃 stereo |
| | 1-518-070 | 〃 dial |
| | 1-520-086 | Meter, tuning |
| | 1-526-165 | Voltage Changeover Block (General Export Model only) |
| | 1-532-210 | Fuse (USA, CANADA Model) |
| | 1-532-251 | 〃 (General Export Model) |
| | 1-534-487-22 | Cord, power (General Export Model) |
| | 1-534-526-21 | Cord, power (USA, CANADA Model) |
| | 1-536-174-12 | Terminal Strip, 4-P |
| | 1-536-177 | 〃 L1 (C) |
| | 1-536-182 | 〃 2L2 (C) |